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Stewart

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VOL. XII.

 The writers alone are responsible for their statements.

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THE NEW YEAR.

This being the first number of the twelfth Volume of the *Sugar Cane*—the announcement offers a suitable opportunity for again thanking our Subscribers, Contributors, and Advertisers, for their continued support, which we gladly avail ourselves of. Some of our readers, who are but remotely interested in the abolition of the export bounties, may possibly think we have lately devoted a disproportionate space to that question. This state of things, however, is not likely to last much longer. The year we are now entering upon will, unless we are much mistaken, witness the extinction of the pernicious system we have so long, so persistently, and, sometimes, almost hopelessly fought against. We shall then be able to give more undivided attention to subjects in which all branches of the great sugar industry are equally concerned.

THE WORKMEN'S MISSION TO THE WEST INDIES.

We learn from information received by the Workmen's Committee, that Messrs. Peters and Monteith, the delegates appointed to proceed to the West India sugar-producing colonies, in the interests of the Workmen's Movement for the abolition of foreign bounties, by the Workmen's Conference of Trades Delegates which was held in London last August, have been received by the British colonists with great cordiality, the deepest interest being evinced

by every section of the colonial community for an early solution of the foreign sugar bounty question. Previous to visiting the British Islands the delegates visited the French sugar-growing colonies of Guadeloupe and Martinique, and were received by the business men and leading officials connected with the Chambers of Agriculture and Commerce in these colonies. After consultation with the French sugar-producers upon the European system of subsidising the production and export of raw and refined beet-root sugars, the representative bodies in Guadeloupe and Martinique resolved to present extensively signed memorials to their home Government urging the French Cabinet to remove the great injustice which the unsubsidised cane sugar-growers of both colonies labour under, and the Chambers of Commerce and Agriculture, it is understood, have accordingly sent representations to Paris from Guadeloupe and Martinique to this effect.

Messrs. Peters and Monteith arrived at Barbadoes in the steamer Bahama, on November 16th, and were received by the President and several members of the Council of the General Agricultural Society of the colony. On the following day the two delegates had the honour of a private audience of His Excellency Captain Strachan, Governor of the Windward Islands, who kindly welcomed them. An important meeting, of which we give a report below, was held under the auspices of the Barbadoes Agricultural Society, on the 19th of November, and a great General Meeting for the island on the 25th of November, of which we hope to give a full report in our next number. It was a great success.

Messrs. Peters and Monteith intend to visit Trinidad, Demerara, and, if time permit, Jamaica. The whole of the West Indian journals of all shades of opinion, unite in believing that the delegates' mission is one which commences and ends by the releasing of free trade sugar-producers from competing with the concealed subsidies of European states, and that no protection can possibly be imputed to those whose request is not for British producers only, but for all ~~foreign~~ cane and other producers, who receive no state subsidies on export.

We have no doubt that as soon as the dead weight of the bounty system is removed from our colonial sugar industry, the constant challenges to capitalists to come and invest capital in the introduction of improved modes of manufacture will be taken up. The effect of foreign subsidies is equally felt upon estates with or without the most modern appliances, and the proposition advanced by some of our contemporaries, that Barbadoes ought to fight the taxpayers of the continent, who pay the hostile subsidies, by investing capital in improved machinery, is hardly consistent with a true appreciation of the real effects of the foreign bounty system on all cane sugar production. As a fact, we know that estates, with the simplest appliances, under vigilant, honest, and skilful management—where the sugar is carefully manufactured, and the casks turn out true to good sample throughout—have been enabled to hold their own quite as well as estates upon which expensive machinery has been introduced.

MEETING AT HALL OF THE AGRICULTURAL SOCIETY OF BARBADOES ON THE BOUNTY QUESTION.

There was a special meeting of the members of the General Agricultural Society, on Wednesday, the 19th November, for the purpose of listening to the addresses from Messrs. Peters and Monteith, the delegates from the Workmen's National Association for the Abolition of the Foreign Sugar Bounties.

The attendance was of a thoroughly representative character, including agriculturalists, landowners, merchants, and others.

The chair was taken by Mr. H. PILGRIM, the president of the Society, who addressed the meeting as follows:—

Gentlemen,—I have to-day the pleasure of introducing to you Mr. Peters and Mr. Monteith, who reached our shores on Sunday. (Cheers.) These gentlemen are delegates from an influential association in England, who are immediately interested in the sugar industry of the British colonies. They are known to us by reputation, as strenuous advocates for the abolition of the ~~bounty~~ system. Our friends of the West India Committee, and our good friends and compatriots, Mr. Forster Alleyne and Mr. Shepheard, fully appreciate the conduct and ability of Mr. Peters, and I am

sure this meeting are well pleased to have him and his colleague in the colony. (Cheers.) It is the object of their association to induce the British Parliament to impose a countervailing duty on sugars fostered by bounties. These gentlemen will, I hope, represent to you more fully than I can the views of their party. I would observe to the society, that what seemed, a year ago, a fruitless effort, now bears a more promising aspect. Our English fellow-citizens seem satisfied that their interests, as consumers of sugar, are bound up with the prosperity of the British sugar colonies, and see that the cheap beet sugar of to-day will be dear beet sugar as soon as the cane of the colonies cannot be produced at a profit and is abandoned; and there appear to be good hopes that the English Parliament will be induced to act on these views. I believe it serves the interest of the party interested in the cane sugar industry to show that there is an ample field in the colonies for supplying sugar to the English market. As respects this small and well-cultivated colony, my opinion is—and it is one which I have expressed before to-day, that although we have no new land to bring into cultivation whereby to increase our crops, there yet remains to the Barbados planter a large margin for increase of crops, by increased use of artificial manures, and by improved modes of manufacture. These views (in which I can be confirmed by the planting body) should encourage capitalists in England to advance money for the better production of our staple. It is a fact better known than acted on, that while the capital invested in estates in Barbados is not yielding a sufficient interest, money spent on sugar estates, in cultivation and manure, yield from 20 to 30 per cent. profit, or return. This may be a problem requiring more explanation than I feel justified in making to-day. Those who are interested, know that I have not made an over-statement. These, gentlemen, are important facts, and I maintain that in no colony,—I will go further, and say that nowhere, can sugar be grown to a better profit than in Barbados. Our large labouring population, our healthy climate, our lime-stone soil, combine to give us immense advantages over other places. (Hear, hear.) The late sudden rise in the price of sugar is a very suggestive incident in the sugar question. We see thereby how high a price the sugar consumers in England would have to pay if left to depend alone on the bounty-fed and uncertain beet. (Cheers.) I may state, in conclusion, that it was our intention to have submitted certain resolutions to the meeting, expressing our sympathy with the British workmen in the movement they have set on foot, but as we have decided to have another meeting—I think it would be as well to make it a general meeting—on Tuesday next, when those resolutions will be formally proposed. And I do hope that on that occasion the people of this country will come forward and show their interest in this important subject. (Cheers.)

Mr. PETERS, who was received with cheers, then rose and said : Mr. Chairman and Gentlemen,—I shall not, in the course of the remarks which I shall make to-day, dwell at any length upon the statistics bearing on the important question upon which I desire to address you, because I assume that most of you, as practical men, engaged in the manufacture of cane sugar, and, therefore, having a deep interest in all that relates to it, are already thoroughly acquainted with that part of the subject. I shall, therefore, confine my remarks to one or two other points ; and first with regard to the history of the movement, and the reasons why we desire to abolish bounties. As the meeting must be aware, there is a very large number of the working classes in Great Britain who depend for their livelihood on her sugar-trade with the tropics. Sugar refiners, coopers, sugar engineers, charcoal burners, dock-porters, and warehousemen,—all these depend to a great or less extent upon the continuance of the sugar trade between Great Britain and her colonies, and anything which tends to put a stop to that trade or to limit or retard it in any way, must necessarily entail serious consequences on all these people. This has been already seen, as I need hardly tell you, gentlemen, in the closing of one of the largest refineries in England, that of the Messrs. Finzell. At that factory no less than from 600 to 700 workmen were employed, but where are they to-day ? Unable to obtain employment elsewhere, owing to the general depression of the sugar trade, they are either roaming about in a state of destitution, or else, forced, along with their families, to depend for subsistence upon the poor rate. It was this failure which first led to the agitation of the British workman against the sugar bounties. The men thus thrown out of employment had a public meeting, at which we resolved to appeal to our fellow-countrymen to assist us in removing this iniquitous bounty system, which is gradually destroying the whole of the sugar trade between Great Britain and her colonies. (Cheers.) At first, not being so thoroughly acquainted with all the bearings of the question as we now are, and looking more to our immediate interest as refiners, we determined to confine our agitation to the removal of the bounties upon refined goods ; but after consultation with other trades in the city of Bristol interested in the sugar industry, it was decided that the agitation should be directed against bounties on raw sugar as well. (Hear, hear.) And I am happy to say that our movement from that day to this has met with the most unqualified success. We immediately put ourselves in communication with all the large working men's associations throughout Great Britain, and we were delighted to find that, although not directly interested in the settlement of the question, they were unanimously resolved that at least fair play should be accorded us ; and they declared their conviction that if any persons deserved free trade competition in

British markets, it was British subjects themselves. (Cheers.) Having thus obtained the approbation and assistance of our fellow workmen, our next step was to send a deputation to the Chancellor of the Exchequer, and this was done in June last year. The deputation was introduced by some of the most eminent free-traders in the country, one of whom, Samuel Morley, Esq., one of the representatives for the city of Bristol, went so far as to say that the bounty system was a scandalous departure from the principles of free trade, and that he was prepared to support a motion for a temporary countervailing duty. Sir Stafford Northcote, in reply to the deputation, made this admission : he said, referring to the statement of the grievance, and the suggestion of a countervailing duty, that "what they proposed was not in any way inimical to the principles of free trade." And when it is remembered, gentlemen, that Sir Stafford Northcote is a Conservative, and, besides, one of the greatest free-traders in Europe, I think you will agree with me that that is a very important admission indeed, and an encouragement to us to continue our agitation. (Cheers.) We next elected a deputation to wait on M. Leon Say, the French Minister of Finance, who, as you are aware, takes a deep interest in the prosperity of the French sugar refining trade, and also upon M. Gambetta, both of whom promised us that they would use all their influence with the National Assembly to pass a bill to remove all cause of complaint on the part of the British workmen. But like all,—at any rate, the generality of politicians, they were very profuse in their promises, but very niggard in performing them. (Laughter.) No such bill has yet been introduced. Mass meetings were then held in London, Liverpool, Bristol, Sheffield, Edinburgh, Glasgow, and other places, and I am happy to say that when we explained to them what we were contending for, their unanimous reply was—"We Englishmen like to see our countrymen have free trade and fair play, and we are resolved that even if we have to pay a farthing a pound more for sugar by the imposition of a duty upon it, to do so rather than see our fellow workmen crushed out of existence." (Cheers.) Thus encouraged, we have continued our agitation, and we intend, with the help of you, colonists, and others interested in the preservation of the sugar-cane industry—for we simply seek its preservation—not to relax our efforts until we succeed in attaining our object. (Cheers.) And here I will remark that we are further strengthened in our desire to abolish the bounty system by the fact that our Governments, both Conservative and Liberal, are opposed to it, and have done all in their power, as far as diplomatic negotiations go, to put an end to it. To my mind, however, it matters not whether bounties are abolished by a countervailing duty or by treaty engagements. The effect is the same to the consumer. I am aware that there are some public

men in Great Britain who regard this duty as a retaliatory measure, and are averse to its being resorted to; but they only take a superficial view of the case. The difference between a retaliatory and a countervailing duty is this:—A countervailing duty accepts the article; a retaliatory duty refuses it. I wish to be as clear as possible on this point, because our only hope of success lies in our being able to prove that a countervailing duty is in no way aggressive or retaliatory. What we want is, to be placed on an equality with other nations, and then there will be a fair chance of our competing with them. (Hear, hear.) A bounty has been defined by an eminent writer on Political Economy as a tribute from nations, as an acknowledgment that they are inferior in competition; and our workmen think that this tribute should be taken for the revenue so as not to hurt one particular branch of industry. (Hear, hear.) A countervailing duty would be a sure means of doing this. At present we have France, Belgium and Holland ready to enter into a Convention with Great Britain for the abolition of bounties, but they make this condition the *sine qua non* of their doing so,—viz., that Great Britain shall not interfere with the chance of their sugar being imported into the country by allowing Austria and Germany to enter with their bounty-fed product. Great Britain thus has the means at her disposal of settling this question, and I think she can no longer shirk the responsibility of doing so. (Hear, hear.) If the bounty system is to continue, it is my earnest conviction that the time will come when it will give such a blow to the old sugar industry of the world that it will take many years to replace it on a firm basis, if, indeed, it ever recover itself. (Cheers.) The sugar trade, gentlemen, is a special question, and, as one of our statesmen has said, requires special attention and special legislation. (Hear, hear.) Unfortunately, however, it is not an absorbing question. It is not like the extension of the franchise or the disestablishment of the Church, for the furtherance of which some enthusiast would take out his cheque book and contribute a large sum. We workmen have to appeal to our own associations for help. They have already helped us, to the best of their ability, and through their aid we have been enabled to place our movement on such a footing as to have even obtained the recognition of the Government, for, as you are doubtless aware, gentlemen, all the writings we have addressed to them on the subject have been published in a Blue Book, and I may say this to, that up to this time no government official, no writer in the *Times* or in any papers opposed to us have been able to say that we have made a single misleading statement. (Hear, hear.) We have tried rather to go under, than over the mark, and this, I believe, is one great reason why we have obtained the approbation and support of our countrymen. (Cheers.) We shall continue to act in the future as we

have in the past, and we feel confident that our labours will be ultimately crowned with the success which they deserve, and that the Government,—whether it be Conservative or Liberal,—will sooner or later concede to us that justice which we claim, and to which we are entitled as British subjects. (Cheers.) As soon as the Select Committee appointed to enquire into the subject meet again next year we shall be ready to give any evidence which may be required from us. And here I may remark that this committee have devoted great attention to the question. It will be seen by reference to the Blue Book containing a report of their proceedings, that on no occasion of their sitting were there less than eleven members present,—which is a clear proof of their earnest desire to settle this vexed question. And I am convinced from what they have done that, at the termination of their labours, they will present such a report to the House of Commons, as will not fail to bring about this great desideratum. (Cheers.) As another means of bringing the question to a successful issue, we have organised committees in all the great centres of the kingdom, whose duty it will be, at the next election, to obtain from candidates an expression of opinion, in regard to it, and to prevent, if possible, the return of any member who is not in favour of imposing a countervailing duty, or else, of summoning a conference of the powers to settle the question. (Hear, hear.) As I said before, some of the most eminent men in Great Britain are in favour of our movement, and if time permitted, I would read to you extracts from letters which have been received from some of them on the subject. As it is, however, I shall content myself with reading two extracts from the letters of Mr. Gladstone. The first was written at the commencement of our agitation, and contained these remarkable passages, which, I believe, have done as much as anything else to help forward our movement:—

"If, as I understand, the circumstances of the case continue unaltered, I think that both the trader and the workman engaged in the business of refining sugar have great reason to complain.

"My desire is that the British consumer should have both sugar and every commodity at the lowest price at which it can be produced, without arbitrary favour to any of those engaged in the competition.

"But I cannot regard with favour any cheapness which is produced by means of the concealed subsidies of a foreign State to a particular industry, and with the effect of crippling and distressing capitalists and workmen engaged in a lawful branch of British trade."

These were the sentiments of Mr. Gladstone on the subject; and writing to us some time after, he said this:—

"Nor have I anything to add to what I have stated on former occasions with reference to the more general features of the complicated and very difficult, but peculiar and hard case of the sugar refining trade.

"In the present state of the question I think it my duty to await the views and intentions of Her Majesty's Government, whose duty it is to take the initiative in such a matter, involving greatly the interests both of revenue and of trade."

After receiving these letters we wrote to Mr. Gladstone, asking him to receive a deputation of working men to talk the matter over with him. He stated, in reply, however, that he regretted he could not receive us, but that if we would reduce our views to writing and forward them to him, he would give them his best consideration. Well, we have done this, and we hope that what we have placed before Mr. Gladstone will have the effect of convincing him that an early settlement of this question is of the highest importance to us, working men. (Hear, hear.) Gentlemen, this question of the sugar bounties is a wearisome one, and I am afraid I have already tried your patience. ("No, no.") Well, then, I will go on to observe that, in my opinion, the unsettled state of the sugar market is one of the main elements which have tended to produce the great depression in trade which has existed for the last five or six years; and I do think that a settlement of our question would help the revival of trade at home. Just before I left England, an order was sent to the iron districts for £600,000 worth of iron for America and Canada; and all the newspapers in the country, from the *Times* down to the smallest provincial, were jubilant over the prospect of the revival of trade. If, however, they would only inquire carefully into the matter, they would find that every month England sends £400,000, either in gold or its equivalent, to Paris, for refining sugar, whereas, if she were only wise in her generation, that sum would be spent in her own colonies, and among her own workmen. (Cheers.) The result of her impolicy is seen in the fact that whereas twenty years ago she produced 150,000 tons of loaf sugar, to-day she does not produce a single pound. (Cheers.) And this represents a loss to the country of a trade worth about £5,000,000 a year. The continuance of the present state of things simply means the transference of the sugar production from the tropics to continental Europe. (Cheers.) We are confident that under free trade competition, with the skilled labour to be had in Great Britain, we will hold our own against all rivals. We are confident, too, that, under such a system, capital will flow into these islands and their prosperity greatly increased. (Cheers.) We British workmen are not in the least afraid of the West Indies producing refined sugar. I believe, however, that the economic problem to be solved is how best to aid the colonies in producing the raw sugar, for exportation to the mother country, to be refined by means of the immense machinery which we possess for the purpose. (Hear, hear.) And now, gentlemen, I must bring my remarks to a close. I hope and trust that you will help us to continue the agitation which has been so auspiciously begun. It is only by determined, united effort on the part of all concerned that any measure can be carried out; and I am convinced that we will all so work together on this question, that when it is brought before Parliament,—as I hope it

will be, next year,—there will be such a division upon it as will show to the world that British subjects have but to lay their grievances before the proper tribunal, and they will be removed. (Cheers.) Gentlemen, I have only now to thank you for the kind reception which was accorded to us on our arrival on Sunday last, and to express the hope that I may see you all at the general meeting, which I understand is to be held on Tuesday next, when I shall address you on some other points which time will not permit me to refer to-day. (Applause.)

The PRESIDENT said he wished to explain to the meeting that the Agricultural Society had recently addressed a petition to the House of Assembly asking them, in connection with the Council, to make some demonstration, either to Parliament or to the Colonial Office, on the sugar bounties; and that they have already appointed a committee to confer with the Council on the subject. He thought, however, that inasmuch as this was a question in which the whole community was interested, that it would be as well that a general petition should also be sent in. He merely threw out the hint, for the consideration of the meeting: if it was deemed advisable to adopt it, next Tuesday they could come to some decision in respect of it. Meantime he should appoint a committee of gentlemen to make the necessary preparations for holding that meeting.

Mr. PHILLIPS regretted that the unfavourable state of the weather had prevented a larger attendance. The number present, however, was an evidence of the interest which was taken in the question, and showed that there was a disposition on the part of the public to aid the delegates in the good work which they had undertaken. And this was only as it should be, for, apart from the direct interest which we sugar producers had in the settlement of this bounty question, as descendants of British ancestors, and, therefore, as fellow-countrymen of the working-classes of Great Britain, we could not do otherwise than sympathise with them in the efforts which they were making to keep themselves from starvation. (Cheers.) Agriculturists in Barbados had had a very hard time of it of late years, owing to this very depression of the sugar trade. Estate after estate had gone into Chancery, and many a man who, but a short time before, was in possession of hundreds of acres, did not own an acre to day. As a body, however, we had managed to weather the storm, and would no doubt be able to hold out until better times came. But with the British workmen, affairs had been far worse. As Mr. Peters had told them, hundreds of them had been thrown out of employment, and were now in a state of destitution, or else subsisting on the poor rates. He (Mr. Phillips) did think that the condition of such a deserving body of men who had displayed such courage and ability under their trials—deserved some more substantial sympathy from

us than was to be afforded by mere words. He should therefore suggest that subscriptions should be collected, and a purse be presented to the delegates to assist them in defraying their expenses. He believed it was only necessary to make the appeal and it would be heartily responded to. (Cheers.)

Mr. HEWITT said he felt pleasure in seconding Mr. Phillips's proposal. (That a subscription list should be opened to make up a purse for the delegates.) It was not enough to accord a hearty welcome to the delegates, but it was also necessary that we should give some substantial proof of our appreciation of the services the working classes of England were rendering to our cause. It was impossible to separate the home from the colonial sugar industry in the efforts which were now being made to secure an adjustment of the sugar bounty question. For his own part, he had almost dispaired of seeing how the matter was to be settled, until the working classes had taken it in hand. And if it was settled, as he expected it would be, to the working classes would belong the honour. (Cheers.) He had been asked how he could lend his advocacy to a movement which was opposed to free trade principles. He replied, he did not borrow his opinions from the *Times* or any other newspaper : he was in the habit of looking at both sides of a question before he came to a decision. He felt he was sacrificing no principle in advocating the movement on foot. The delegates of the several trades, representing the home and colonial sugar industry, in their memorial to the Prime Minister, distinctly stated that the foreign export bounty system violated the cardinal principles of free trade, to the detriment of all free trade competitors on British markets, by causing prices to be adjusted, not by competing relative costs of production, but by competing State subsidies. That was a fact which the *Times* nor no one else can get over. Mr. Walpole, one of the best informed men on the subject, in his evidence before the Select Committee of the House of Commons, adopts this view, and says that this foreign export bounty system operates most prejudicially upon British labour, and that no compensating benefit can be fairly credited to the nation at large. It was under these circumstances that the memorialists were the more emboldened to declare that on British markets the full doctrines of free trade should reign supreme, undisturbed by fiscal advantage to any competitor, whatsoever, or howsoever, and that legislative enactment should reduce this sound principle to a practical reality. Was there anything unreasonable in asking the Imperial Parliament for a measure of reform to this extent ? It behoved us, if we desired to save the colony and ourselves from ruin, to co-operate with those who were fighting the battle for us on the other side, and make known to the Imperial Parliament the cruel sufferings we were undergoing through this foreign export bounty system. It was bringing everything here to a standstill.

Sugar estates in full cultivation had to be abandoned to the care of the Court of Chancery for the want of means on the part of their owners to keep them up. The credit of the island was for the moment suspended. Men with capital were forced to hold back until the Imperial Parliament had adopted the required measures for placing British sugar industries on a firm and secure basis. We had learnt from late papers that the majority of bounty-giving nations were prepared to abolish bounties, provided efficacious measures were adopted by Great Britain against such nations as continue them. The solution of the bounty question, therefore, now rested with the Imperial Parliament. We had a grievance, and it was our duty to submit it fearlessly to the wisdom of Parliament for redress. There was one matter he wished to point out to Messrs. Monteith and Peters, and he should be glad if they could find a way to make English capitalists aware of it. They all knew what a large amount of capital the English had thrown away on foreign loans. There was no necessity for them to repeat this. In British Guiana and the West Indies the English nation owned some 55 millions of acres of land. On most of it, from £10 to £20 an acre could be profitably employed. Our experience of the land of Barbados was that, under a normal condition of things, it required £12 an acre, or thereabouts, to keep up its cultivation, and on that outlay a return of 25 per cent. at least could be counted on. It was for this reason that land in Barbados was a great industrial question. He would again remind the meeting that it was desirable as soon as possible to bring under the notice of Parliament this grievance of ours, in order to obtain that measure of reform which the justice of our case demanded.

Mr. JOHN T. GREAVES proposed that a vote of thanks be accorded Mr. Peters for his very able and lucid address, which had led, he was quite sure, to a more correct understanding of the whole question of the sugar bounties. The speech, if delivered in the House of Commons, must have commanded attention, and he would say that he had considerably improved his own knowledge of the subject by listening to it. He thought there was no resisting the views advanced by Mr. Peters, and that the meeting should feel very grateful to him for putting them forward so earnestly, and so extensively.

Mr. J. W. WILSON had pleasure in seconding Mr. Greaves' motion for a vote of thanks to Mr. Peters, and before taking his seat would notice that the idea of the system of bounties (if not speedily suppressed), extending and affecting, as it did, other industries besides the sugar industry, was one which he learnt was fast taking hold of the English mind. Although the first to cry out, we should not be the last if the British Government did not at once suppress bounties, either by treaty, by countervailing duties, or in some other efficient manner.

Mr. MONTEITH:—Mr. Chairman and Gentlemen: After the

lengthy address of my colleague (Mr. Peters), it is unnecessary for me to detain you with any remarks of my own, especially as I should be obliged to traverse much of the ground which he has already occupied. As he has told you, we are in earnest co-operation with other departments of labour at home, for the purpose of securing for an old and honourable branch of British industry that free and fair competition on British markets which it is our inherent right, as British subjects, to demand; and I can assure you, gentlemen, that our efforts will not be relaxed until we have obtained this desirable object. In the name of the trade I represent I thank you, gentlemen, for the very kind and courteous manner in which you have received us. (Cheers.)

Mr. PETERS, in acknowledging the vote of thanks unanimously accorded to him by the meeting asked that all present would attend the public meeting, which it was decided should be held on Tuesday, 25th instant. He would try to give them something quite new, as he had not yet exhausted all he had to say on a subject which he had much at heart.

A vote of thanks to the chairman, moved by Mr. S. F. Hewitt, terminated the proceedings.—*Barbadoes Times.*

PUBLIC MEETING ON THE SUGAR BOUNTIES QUESTION.

A public meeting to protest against the foreign sugar bounties was held last night (Dec. 8th) in the Town Hall, Greenock. There was a large attendance of working men. Provost Campbell occupied the chair, and there accompanied him to the platform Councillor Black, Messrs. John Neill, sugar refiner; Richard Hunt, Bristol; Thomas M. Kelly, assistant secretary to the London Society; M'Nair and M'Kinnon, Glasgow; Donald McDonald, secretary Sugar Porters' Friendly Society; James Wilson, treasurer of the same society; Alexander M'Kellar, secretary Greenock Sugar Bounties Committee; Alexander M'Lean, David Dixon, Ronald M'Lean, R. Mills, John Paterson, David M'Coll, Duncan Campbell, Barr, Livingstone, Rorison, &c. The Thistle Band, under the able leadership of Mr. Whiteford, was in attendance, and prior to the meeting had paraded several of the principal streets of the town. On the entrance of the Provost, the band struck up "The Campbells are coming."

Several letters having been read from gentlemen who were unable to attend on account of prior engagements, and one from Mr. J. Stewart, who deemed his attendance would be inconsistent with his position as a member of the Select Committee of the House of Commons on the Sugar Bounties, the CHAIRMAN spoke as follows:—He dared say that the question that was come before them was one in which a great many of those present took a deep interest—the question of the sugar bounties. (Applause.) He had no doubt whatever that most of those connected with the sugar trade—the coopers and all others affected by that industry or by the drawbacks to it—knew the question very well. It was scarcely needful for any one to explain it to them. However, they had present some gentlemen who took a special interest in the question—gentlemen from Bristol, London, and Glasgow—who would address them. They were well acquainted with the drawbacks to the sugar trade in consequence of the bounties given by foreign Governments, and no doubt they would fully explain the question to the meeting. He might say in reference to the matter himself that he was quite at one with those who wished to get rid of those bounties. (Applause.) He thought that it was quite opposed to what was fair in trade that foreign Governments should give bounties to their manufacturers, or even to their raw producers, so that it tended to the disadvantage, or rather, in some cases, even to the ruin, of our own industry. (Applause.) He held very clearly that France, Germany, Austria, and Russia, in giving those bounties, were acting unfairly to the manufacturers of this country. (Hear, hear, and applause.) He was very much surprised that the French people, now that they had the Government in their own hands, should continue to allow the system of bounties to prevail. He was strongly of opinion that very soon the French people would come to see that it was very unwise to continue to give bounties to the refined sugar manufacturers of France for the purpose of selling cheap sugar to Great Britain. Why, France was being taxed to a very heavy amount to make up for those bounties. That such a highly intelligent nation as the French submitted to that was very extraordinary. He was not

very sure that the French people knew the thing very thoroughly; but he believed they would very soon understand it, and they would say that they were not going to benefit the people of this country with sugar at a lower price than the people of this country could manufacture it for themselves. (Applause.) Of course, no doubt those countries like Germany, Austria, and Russia were in a somewhat different footing; these were imperial countries where the people had little to do with the Government. He had far less hope of those imperial countries than he had of France, except by bringing some kind of pressure to bear upon them. How was this best to be brought? Whether by our Government meeting with the Ambassadors of these countries, or by getting some Convention, or whether by countervailing duties, or whatever way, some pressure must be brought to bear upon them. He did not look upon the countervailing duty as the best way. He wished he saw some better way; but they would shortly hear addresses in favour of that way of doing it. He would far rather get the people in other countries to see that the system was wrong and that they had made a mistake. He would be inclined to go in for any other fair and legitimate way before going to countervailing duties; but in the meantime his mind was not altogether made up, and he should be delighted to hear what the speakers had to say about it. (Applause.)

Mr. M'KELLAR was then introduced to move the first resolution. It was as follows:—"That, in the opinion of this meeting, the continued operation of the foreign export sugar bounties prevents the revival of the great loaf sugar industry of the United Kingdom, materially injures the interests of British labour generally, and retards the cultivation of cane sugar in our West Indian and other sugar producing possessions; and inasmuch as all negotiations have yet failed to effect the abolition of bounties, this meeting is of opinion that Parliament should take prompt and efficacious measures for the restoration of free trade on British markets by taxing off all bounties as revenue." Mr. M'Kellar said the bounty system had materially injured this country. If the loaf sugar trade had consequently declined what reason was there for thinking that the

moist sugar trade would not also be suppressed? Why should they allow the system to be carried on? It was only the thin end of the wedge. They had a grievance, and a right one too, because they would allow no foreigner to supplant their industries which they could honestly and faithfully maintain in fair competition. (Applause.) These foreign countries had taken from 18 to 20 millions sterling from the British product, because this country could save that amount of money by cultivating our West Indian Colonies. (Applause.) That was taken from the artisans who were dependent on the sugar production of this great Empire. They must have united action, and have those bounties removed at all hazards. If it did not affect the town of Greenock and those concerned in it, it was very strange indeed; because had it not been for the sugar industry last winter, it would have been a poor Greenock on account of the state of trade in it. (Applause.)

Mr. MCNAIR, of Glasgow, in seconding the resolution, remarked "that it was only great capitalists who had been enabled to float through the present crisis, and that they (the sugar bounties) were the means of causing a sort of semi-slavery, because planters were forced to get more work out of their labourers than they would get if they were to have a fair remuneration for their produce."

Mr. KELLY, of London, in support of the resolution, said that last year himself and a colleague from the South had had the opportunity of speaking to the working men of the important town of Greenock on the bounty question, and it afforded him immense pleasure in again speaking to those who, like himself, were interested in the prosperity and the progress of the home and the colonial sugar industry. (Applause.) They were there as working men to consider the system of export bounties on sugar, and if they thought they could prove that it was a pernicious system, they were there to enter their protest against the further continuance of it. He would endeavour to explain why those bounties should be countervailed by a free-trade measure of an intercepting duty, and no longer be allowed to operate to the disadvantage and detriment of home labour and industry. (Applause.) If the Frenchman, or Dutchman, or Belgian, could make loaf sugar with more

skill than London or Bristol workmen, or if their natural advantages were greater than those of the West Indian Colonies or other parts of the world, there was nothing to complain of. They might ask for sympathy, but not for co-operation in destroying the system. The import of refined loaf sugar into this country at the present time from France, Holland, Belgium, &c., was valued at between five and six millions sterling. The money was transferred from the wage fund of this country to employers of foreign workmen. But the bounties could do more if allowed to continue. Many people thought that because the moist sugar refining industry of Greenock and Liverpool was a little prosperous at the commencement of this year, it would continue to be prosperous. Nothing of the kind. There was no greater fallacy. People said the moist sugar industry was secure, because the refiner could purchase the beet sugar in a cheap market. But he was there to say that there was no security for the moist sugar industry, or for the labour connected with the production of the moist sugar industry, while bounties in any form continued. Neither refiner or workmen had any benefit whatever in purchasing from Austria, Germany, or Russia, in an artificially depressed market. The sugar refiner of Greenock, or of Liverpool, or of any other place, who refined moist sugar, had no interest in keeping up an export bounty upon moist beetroot sugar, or even upon loaf sugar. (Applause.) There was no greater curse to a nation than to adopt a system of aggressive protection. If we allowed foreign countries to attack industry after industry in that way, naturally we must either emigrate or become recipients of already overburdened parishes. (Applause.) We had held our natural advantages until 1862, and now we were in the position that our export trade was all but destroyed. This was a question which must be looked at from an economical and from a free trade point of view, because, as the representative of many thousands of working men in London dependent upon the sugar industry, he could say that he would not be there to ask their co-operation in that movement if they could not defend their proposal of a counter-vailing duty upon the soundest basis of political economy. (Applause.) Their Chairman—all honour to him for presiding; he

was where he ought to be—(applause)—their Chairman had said that he did not like the idea of commencing countervailing duties. Nor did he (Mr. Kelly) nor did any of the other workmen in that agitation. But they said that they had waited long enough. Negotiations had gone on from 1864 till 1877, and now they could not wait any longer, and they were justified in the proposal of countervailing duties, because they were not the architects of that duty, but the Right Hon. W. E. Gladstone himself. (Applause.) In 1868 the total production of beet sugar in France, Belgium, Holland, Austria, Russia, and Germany only amounted to 672,000 tons. Ten years afterwards, in 1878, that production, through the Austrian bounty, and the German bounty, and the Russian bounty, went up to 1,415,000 tons, or doubled itself in less than one decade. That was the result of the artificial supplanting the natural channels of production and of industry. They ought to be thankful for the abundance of any commodity which can be consumed by the people, but if the system whereby that commodity was forced into the market was wrong, and had the effect of injuring the consumer in the time to come, they ought to be able to suppress it. They found the bounties on export to operate in two ways. For a time it kept down prices on the natural cost of production, but, as Lord Derby had once said, the consumers of to-day only benefited at the expense of the consumer of to-morrow. (Applause.) They found that negotiations for suppressing these bounties had been going on for 13 or 14 years; that foreign Governments had been deaf to all their entreaties. In answer to the deputation of workmen who had gone to Paris, M. Say and M. Gambetta had promised to bring in a bill in the French Chambers for the abolition of these duties. That was in October, 1878. Now it was December, 1879, and there was no talk about the bill. France sheltered herself behind Austria, and Belgium was now in the same boat. They said they were willing to do away with the bounties provided the United Kingdom gave them fair play in their markets, and neutralised the Austrian bounty by a countervailing duty. Was that not a fair proposal. (A voice: "No.") It was not only a fair proposal, but a free-trade proposal. (Applause.) When they went to the Chan-

cellor of the Exchequer the other day, and asked him to impose a countervailing duty, he said that he had been reading an article in the *Times* which said that if foreign countries chose to put bounties on, and thereby supply us with an article cheaper than it otherwise would be, we had nothing to do but to take advantage of it, and that we need not trouble ourselves as to the effect it had upon themselves or upon that particular trade. But the Chancellor of the Exchequer had entirely dissented from that view. He did not think they ought to comfort themselves with such arguments. (Applause.) The Chancellor of the Exchequer was an eminent free-trader, and he said that nothing would justify continuing an export bounty because it forced a little transitory cheapness. What the state of things would be at this time next year Mr. Kelly did not know. He knew only that so long as a bounty in any form continued, so long would it destroy security amongst the producers and the West Indian Colonies. The other day they had written to Mr. Gladstone asking his opinion as to what they should do, and his reply was that if the circumstances of the case continued unaltered, he thought the trader and the workman had great reason to complain. Mr. Kelly said that if they waited until these foreign countries abolished the bounties they would have nothing to quibble about, because the sugar industry of this country would have become a thing of the past. (Applause.) It was said that they were going back to reciprocity, to protection. They were there, as it were, to complete free trade. Free trade was not perfect. One of the imperfections of free trade was that the free-traders of this country had left themselves open to be attacked by aggressive protection, and it was the duty of the most loyal free-trader to act so that free trade should operate on the home market. Free trade meant, and meant only, the interchange of natural advantages at the lowest cost of production between one nation and another. It meant that they should take from the world everything it had to give, free and untrammeled with state bounties, or any other form of premiums or aggressive protection, and that they, in return, give what they have on the same principle. (Applause.) If they wanted reciprocity for the sugar industry in this country,

they would urge the Government to put on an equal duty against the foreign sugar coming into their ports, as foreign countries put on their duties against the sugar from this country coming into their markets. (Applause.) In concluding, Mr. Kelly remarked that he sought to say that as working men they had no desire to go back to protection in any form. They did not want reciprocity, because they did not believe in it. What they sought was to compete with the whole world on fair terms; and if foreign nations possessed greater natural advantages of skill and production, they must then retire and hold their tongues. Their proposal was based upon the true principles of political economy, and could be justified upon the soundest principles of political economy. (Applause.)

As the Provost was about to put the resolution to the meeting—

Mr. HUGH GRAHAM came forward, amid hisses, and moved the following amendment: "While sympathising with the continental nations at the injustice which they suffer under the present system of sugar refining, whereby a special industry and a few individuals are subsidised, to the injury of the taxpayers and consumers generally in these countries, we deprecate, in the strongest manner, any attempt or proposal to impose an import or compulsory duty on sugar into this country as being opposed to the material welfare of our people, and opposed to the great principles of free trade, under which our trade and commerce have greatly prospered."

When the audience heard the nature of the amendment, their disapproval of it was so great that Mr. Graham could not proceed.

The PROVOST said: I think this: we ought to give fairplay to everybody. (Great applause.) Recollect I am here as the provost of the town. You have given all the gentlemen who have spoken a fair hearing. Mr. Graham is entitled to a fair hearing also. (Applause.) I stated before that my own mind is not made up, and I think we ought to hear both sides, and then come to a decision. (Applause.)

Mr. GRAHAM said he was very much obliged to the Provost. That was a question that affected every industry, and not only the sugar producing industries. It was a question that affected any other commodity they use in their households, or that they put

upon their backs. It was true, perhaps, that the sugar refiners had been complaining of dull trade for a time, but was it not equally true that, during the last three or four months, they had had it on the best authority that by the law of supply and demand the refiners had been amassing in a few days what would be considered by any of those there an ample fortune? (Great applause.) Now, he was there in the interests of free-trade and in the interests of the people. He was not there, as a paid hireling, to stump the country to try and hoodwink the people to abandon those principles which had brought comfort to many homes when they were destitute and afflicted. Was it not the case that the farming interests were suffering much more than sugar refining interests? ("No, no," and applause.) What would they think if farmers were to hire men to go through the country trying to arouse the people—(great interruption)—to put a duty upon corn, and to revert to the old prices—(interruption)—to protection, whereby their corn and their wheat would be taxed, and food would be increased in price? (Great uproar.) He warned them that if they agreed to such a proposal as that of a countervailing duty, they were going in the very direction that would tell upon themselves in other quarters. They would forfeit their right to have a voice in the making of the laws if they sought to revert to the old principles of protection—("No, no")—when they might have free trade, and Liberal principles to regulate and guide them in their affairs. Let them be careful of what they did. He was aware that many who were interested about the sugar trade only thought from what they had heard. ("That's the thing to look at.") But although they were in that trade, there were thousands in other trades—(great applause)—and as sensible men they must not only look to themselves, but they must look to the other side of things. (Applause and general interruption.) The man that simply looked at what affected himself was not a man at all. They must look to what affected the great body of the people—the nation—and not only to their own class interests. (Interruption.) He had been led to understand from the bills that Provost Lyle and the Member of Parliament were to be there. He was thankful they were not

there. Those gentlemen were intimately associated with the sugar trade. Were they come there to vote for those gentlemen to make laws for mere class purposes, or for personal interests? Let them say that they would not depart from those principles of free trade which had brought so much comfort and so much prosperity to the country during the last thirty years.

Mr. DAVID MAXWELL seconded the amendment.

Mr. KELLY rose to say a word of explanation relative to what Mr. Graham had just said, and which he had no doubt Mr. Graham very much regretted. He (Mr. Kelly) was secretary of a trades union, and paid by his union, to which working-men contributed, to come there and ask their support in that movement. He had no connection with refiners. (Applause.) Again, he might say that what they wanted had nothing to do with the farmer or with anybody else. The farmer did not compete with an export bounty. There was no analogy whatever between wheat and sugar in this case. (Applause.) What they were fighting for was not to protect their home refiners, but to neutralise foreign bounties by means of simple countervailing duties. What they wanted would not benefit either workmen or refiners one penny, but would benefit the taxpayer of the country.

On a vote being taken, only six held their hands up for the amendment, so that the resolution was almost unanimously carried.

Mr. JOHN M'LEAN moved: "That this meeting, believing that France, Belgium, and Holland are prepared to abolish all sugar bounties provided that Great Britain will impose a countervailing duty on all sugar imported under bounty, declares its opinion that the time has arrived for an appeal to Parliament for the imposition of a countervailing duty, so that Her Majesty's Government, the duty being in operation, may be thereby enabled to bring negotiations for the international suppression of all bounties to a speedy and successful issue by the restoration of perfect free trade competition." The fact indicated in the opening part of the resolution (Mr. M'Lean said) was very gratifying. He might state that negotiations had been going on for the last fifteen years for this purpose, and the working men, realising that if it was left to the

continental nations to abolish the bounties, they would never be abolished, had determined to raise their voice by public meetings such as the present in all parts of the country. In the first place, an export bounty might inevitably cause the subsidised commodity to be sold below cost price. The French admitted that it was sold below the price at which it could be produced if there were no bounty, so that we must not go away with the idea that the French people were satisfied with the system. The French people had themselves to be taxed in order that sugar could be exported to this country under its natural price. Even those more directly interested in the trade said that the system was bad, and they had agreed to abolish the bounties provided Great Britain imposed a countervailing duty as against all the other nations who would not agree to the system of refining in bond, and by that system doing away with bounties. Now, he was very glad to hear the amendment proposed by Mr. Graham, because unless there was an amendment the true feeling of the meeting could never be tested. Mr. Graham was as much entitled to hold an opinion as any one else, and it was gratifying to be able to state that this meeting gave him a patient and attentive hearing. ("No," and laughter.) Mr. M'Lean read a quotation from a speech by Dr. Cameron, M.P. for Glasgow, whose free-trade principles had never been questioned, to show that Mr. Graham was under a wrong impression in thinking that a countervailing duty would interfere with free-trade principles. He might refer to the opinions of other free-traders, such as Mr. Duncan M'Laren, Mr. Samuel Morley, and Sir John Lubbock. He would remind the meeting that a countervailing duty was no new thing in this country. It was not only not a new thing, but it was in operation, and was quite in accordance with the commercial policy of this country. The Commissioners of Inland Revenue in 1870 adopted a countervailing duty of 5d. per gallon, so as to place British and foreign spirits on an equal footing. The same thing was done in the case of tobacco and cigars. It was thus shown that free trade principles and a countervailing duty were quite in accordance with each other. More than that, the remedy of the countervailing duty would simply restore matters to the position

that they would be in were there no bounty, and there would therefore be a return to free trade, instead of, as in the reciprocity case, an aggravation of protection. (Applause.) He would now refer to a letter which had appeared in the *Telegraph* of that day, signed "More Light," and referring to some former remarks of his. Perhaps it was Sugg's patent in the square that had suggested to this correspondent his *nom de plume*. (Laughter.) However, from the tenor of the letter it was evident that the correspondent stood greatly in need of more light, and he was glad that he had come forward to ask for it. The correspondent (said Mr. M'Lean) calls in question the statement made by me that 36 loaf sugar refineries, which were working in this country, were all now shut up, with the exception of one. He wants to know where they are situated. Well, they were situated as follows:—In London there are 25; in Hull there is 1; in Sheffield there is 1; in Plymouth there are 2; in Liverpool there are 2; and in Bristol there are 4. And without at all putting myself forward as an expert arithmetician, according to my humble calculation that is 35, and the one that is working is 36. (Applause.) I do not know whether that will satisfy the correspondent or not. If it does not satisfy him he is perfectly at liberty to correspond with me, either through the columns of the local papers or by private communication, and I will be very happy not only to illuminate him, but also to electrify him on that subject. (Laughter and applause.)

Mr. RICHARD HUNT, of Bristol, in seconding the resolution, said: "He was not sent there, as the friend who had moved the amendment has said, to scour the country over, and force a system of reciprocity and protection upon the people; far from it. He had been sent there to assist in removing what had been designated, and rightly so, one of the greatest plague-spots that ever disgraced Continental Europe." In proof of his assertion, he went into a mass of statistics, in which we are unable to follow him for want of space. He concluded by explaining the difference between reciprocity (which protectionists were calling for) and a countervailing duty, which would simply enable them to compete on fair terms with their continental rivals—adding, that if they could not then do so successfully, the whole of the trade in this country must die.

Mr. ROBERT MORRISON, Leith Custom House, who spoke from the boxes, said he would like to ask Mr. Hunt when the bounty that he complained of was first established, and also what was the cost of working a sugar house in France, as compared with working a sugar house in Greenock ?

Mr. HUNT said that if he were a sugar refiner, which he was not, but only a cooper, he might be able to answer the question. It was not part of his business to inquire into an employer's affairs ; but he might tell the gentleman, for his information, that the bounties originated in 1861, and had been in existence ever since. In 1871, in order to make up the great war indemnity, the duties were doubled, and it was since then that the destruction of this country's industry had taken place.

Mr. MORRISON thought that when a gentleman came to debate a question he should be acquainted with all the details. He held that it was not the bounties at all that had caused the destruction he spoke of. He held it was caused by this country giving free trade to all the nations of the earth, while the nations of the earth would not give free trade in return. It was a one-sided free trade. (Applause.) If they were to protect the sugar trade they would also have to do the same for paper, glass, pianos, shoenails, or any other trade. [Mr. Morrison was at this stage received with cries of "Platform," and he at once proceeded thither.]

The CHAIRMAN : To be in order, Mr. Morrison, I suppose you are going to move an amendment.

Mr. MORRISON said he had as great an interest in this matter as any sugar refiner in Greenock. He happened to be here, but had no intention of attending the meeting, and it was only in passing on the way to the Post Office that he heard there was a meeting on the sugar bounties question ; and it was such a sweet subject, and he had such a great interest in it, that he wished to be enlightened. But he might tell them that if they put a duty on sugar, they must of necessity put a duty on every other manufacture. They should not give protection to the sugar refiners any more than they would give it to the paper manufacturers.

Mr. M'COLL : We don't want it.

Mr. MORRISON: Half a minute, if you please; and then you can come here and say what you wish. He would show them that the paper trade had far more cause to complain than the sugar trade. The paper trade, before it could import rags from Belgium, Holland, or France, must pay 10 per cent. of an export duty. Their paper works paid freight into Leith, or other places, upon the rags; then they were made into paper at those places, and sent back to the continent again, and they had to pay 20 or 30 per cent. of duty on the paper going into France, Belgium, and Holland, while this country took in the paper of the continental countries without their paying a farthing of duty. Was that right? (Voices: "No.")

The CHAIRMAN: Mr. Maxwell is going to move an amendment, and I would like to give him the opportunity.

Mr. MORRISON: Give him the opportunity after I am done. (Applause, and hisses.) Mr. Morrison then proceeded to give his opinion that it was not the bounties, but the abolition of our own sugar duties, which had afforded a little protection, together with the fact that the French could work at a lower cost; that other English manufacturers were suffering from the same cause, and, until this was put right, neither the sugar nor any trade (English, of course) would ever prosper.

The CHAIRMAN said he had allowed Mr. Morrison to make his speech because he was an old Greenock man, and interested in the question. He had only to say that if paper manufacturers were in the same position as sugar refiners, then both should go together, and try to get the amendment made. (Applause.) Two blacks won't make a white.

Mr. DAVID MAXWELL moved, as an amendment, "That this meeting resolve to give no countenance either to reciprocity or to countervailing duties." He did so, first, because it would be setting a precedent to other manufacturers to act similarly under similar circumstances. Secondly, because it imposed a tax upon the necessaries of life which working men use very largely every day. The money gained by the countervailing duty goes into the pockets of the sugar refiners—"No"—while on the other hand it

does not add one penny to the working man's wages. Masters are, to use a phrase that had been used that night, dealing with workmen upon the principle of supply and demand; and if they could get a man for 15s. they would not give him 20s., no matter how much he made upon the sugar. (Applause.) Their friends had spoken as if reciprocity and countervailing duties were two different things. He was very glad they had come from England to teach us the meaning of words. (Laughter.) He held that reciprocity signified "to take and give;" and if they put a countervailing duty upon sugar, he asked was it not giving to the one nation what the French people gave to the other? (Applause.) So that, after all, reciprocity and countervailing duty are but one and the same thing in his estimation. ("No.") Again, they were told by one of the speakers that the working men paid him to come here and teach us our duty. He (Mr. Maxwell) should like to know what working men paid him for that purpose? He should say they had plenty of money who did it. (Laughter and applause.) Another speaker said the French system was a bad one, and yet wished us to intimate their principles. He would conclude by proposing the amendment. (Applause and hisses.)

The Provost asked if the amendment was seconded, and the inquiry was received with cries of "No, no!" He then declared the resolution carried.

Mr. Young, cooper, proposed: "That this meeting resolve that copies of the foregoing resolutions, signed by the chairman, be forwarded to the Chancellor of the Exchequer, Mr. Gladstone, and Mr. James Stewart, M.P. for the burgh." Mr. Morrison seemed to be wanting to go further than they did—

The PROVOST: He is an old Tory I am afraid. (Laughter.)

Mr. YOUNG (continuing) said he would give Mr. Morrison his support and sympathy in anything he might do for the benefit of the businesses which were suffering from foreign aggression.

Mr. M'KINNON, Glasgow, seconded the motion. The Governments of the last fifteen years had all (he said) sympathised with the planters in the West Indian colonies and the sugar refiners of England, and he had no hesitation in saying that there must have been some good reason for their sympathy.

The resolution was carried unanimously.

The PROVOST said that as chairman of the meeting, he would be glad to sign the resolutions and forward them to the proper quarter. (Applause.) Mr. Morrison's statement just showed how difficult it was sometimes to do a good thing for one trade without having others brought up which might also have a good case. No doubt everybody was agreed that the bounty system was thoroughly bad, and Mr. Hunt showed clearly that Mr. Morrison was mistaken in his ideas. Mr. Morrison, for instance, said the French bounties had been a long time in existence, and Mr. Hunt pointed out that after the war with Germany the bounty was doubled in France. This country could compete against £1 per ton, or even against £2 per ton, because we have advantages which the French do not possess, such as abundance of coals, and water in great abundance. But if the bounty was £3 or £4, they could not compete against such a sum. He (the Provost) thought they had a great grievance, and they should do all they could to get it remedied; but whether it should by a countervailing duty he was not prepared to say. Mr. Morrison, as they saw, would put a duty on goods coming from other countries, but then Mr. Morrison was one of those old-fashioned Tories—(laughter)—that thought all goods should be taxed. He (the Provost) did not think that. He thought, on the contrary, that all goods should be free—(hear, hear)—and that they should not be saddled with these bounties. (Applause.) But as to the best way of settling the question, he would leave that to Parliament. He did not think that suggested in the resolutions was the best, but as the meeting had decided emphatically in favour of the resolutions, he would sign them. (Applause.)

On the motion of MR. M'KELLAR, votes of thanks were passed to the speakers and to the Provost for presiding, "three cheers" being given for the Provost.

The CHAIRMAN acknowledged the compliment, which closed the proceedings.

“GILL’S PROCESS FOR DEFECATING CANE-JUICE
BY GALVANISM.”

The experiment in sugar making by “Gill’s Process” tried last week on Zeelandia, Wakenaan, was not as successful as the gentleman who invented the process made sure it would be, but it was not such a decided failure as were the former experiments in connection with the same process tried some years ago in this colony, and the gentlemen—(Mr. Williams, the Sugar Chemist at *Bel Air*, Mr. Bellairs, Mr. Stephenson of Pln. Hague)—who superintended this the latest experiment are convinced that the invention is not without merit, and that it is capable of being modified and converted into a valuable system of sugar manufacture, possessing as it does unmistakable elements of success. The great drawback to the success of the experiment just over, was the imperfection of the apparatus in which the galvanic battery is placed. The bottom of the “separator” or tank is covered with sand through which the juice, after being charged by the battery, has to percolate, but, in practice, it was found that the percolation was far too slow to keep time with the quantity of juice admitted, and the consequence was an almost constant overflow of the tank, and—equally as troublesome—a displacement of the sand by the large quantity of juice forcing its way through. The sand also would require to be changed very often, for the impurities it gathers in a very short time render it liable to produce a deleterious effect upon the juice by creating acidity in it. Juice which had been left in the tank for $19\frac{1}{2}$ hours, although covered with oil,—this being Mr. Gill’s prescription to keep the juice sweet, was very acid and in a state of active fermentation. Its density was 8·6 glucose 0·55 per gall. (55 grammes per litre) and it was too acid to defecate for polarisation. To obviate the overflowing of the separators in the way we have described, the conductors of the experiment had them raised on bricks and had sand added to a higher level, so as to assist the filtration, but the result was still the same. The experiment was begun on the afternoon of the 16th, five clarifiers being filled that night, but it was found necessary to give

24 pints of cream of lime equal to 6 lbs. of Bristol hand-picked lime to each of these clarifiers, in consequence of the extreme acidity exhibited by litmus. In the early part of the same day, the same clarifiers of juice from similar canes treated by sulphurous gas required only 20 pints of similar cream of lime to produce a neutral temper. Next morning the grinding was resumed and 25 clarifiers were filled, the total number for both days being 30, viz., 22 containing 800 gallons each, and 8 containing 700 gallons each, or 23,200 gallons in all. The juice of this second grinding, was *not* "limed." The juice obtained from the canes was slightly acid and in good condition, and when tested showed an average of 9·7 Beaumé, density; the polarisation showing 1·58 lb. of crystallisable sugar and the glucose ·08 lb. per gallon, or 158 grammes per litre of crystallisable sugar and 8 grammes per litre of glucose. The morning after the first spell of grinding, the liquor sent down to the copper wall showed an acid reaction in first teache, less acid in second teache, and the condition of the grand copper was similar to that of first teache. The density of the 1st copper was 16·8, polarisation 2·888 lbs. crystallisable sugar to the gallon, or 288·8 grammes per litre; 2nd teache density 15· and pol: 2·545, or 254·5 grammes; and grand copper, density 12·8 and pol: 2·159, or 215·9 grammes. The syrup of the five "limed" clarifiers, when taken off copper wall to syrup subsiders, showing a density of 19·7 and polarised 3·454 lbs. to the gall. The average density of the syrup of the grinding on both days was 15· B. The number of gallons of juice treated was, as we have already mentioned, 23,200, the average polarisation of which was 1·58 lbs. per gallon=36,656 lbs. of sugar and the actual result was a return in sugar of ten hogsheads and 4 brls. with a nett aggregate of 19,802 lbs. or say 54 per cent. of the polariscope reading, the juice used being at the rate of 2209 gallons per hhd. or ·85 lbs. per gallon. The molasses filled 13 puncheons and 1 brl., the net weight being 16,409 lbs. With regard to the quality of the sugar made, we understand it was of anything but a superior grade, and that some of it was decidedly inferior. It would have been interesting if the experiment could have been repeated under certain alterations which

suggested themselves to the conductors, but it is a serious matter to experiment with the large pans used on an estate of the size of Zealandia, one strike giving about eight tons of sugar, the market value of which would be a large amount to lose if the experiment went wrong. The experimenters were very anxious to have tried the result of *reboiling* the molasses, as Mr. Gill says that can be done again and again, but it was not convenient for them to do so. If Mr. Gill determines after he reads the report of this latest experiment to call upon his planter friends to give his process yet another trial, he ought to seek out the owner of a small estate where a series of experiments could be conducted with less labour and expense than on a large estate. He would do well too, to get a careful scientific sugar manufacturer, such as Mr. Williams has proved himself to be, to conduct the experiments. One thing Mr. Gill should clearly understand, and that is that there is no bigoted opposition to his process amongst the planters of this land. If his invention can be conclusively shown to be capable of making the best quality of sugar at a cheaper rate than by any of the processes now in use, he may rest assured that it will be speedily and extensively adopted.—*Demerara Royal Gazette*.

A FEW REMARKS SUGGESTED BY THE PRECEDING REPORT ON GILL'S PROCESS.

A picture that is a picture, must undoubtedly have shadows in it.

A picture that is all in light,—says Doctor Woolcot,
What a thing, a very fright,
So let some darkness be displayed,
And learn to balance well with shade.

Shadows help us to appreciate the approach to perfection. Some shadows are laid on with the bold dash by the master-hand of experience, other shadows may be indistinct, tentative, insufficient, betraying the indecision of the artist in conception, possibly in execution, either or both, yet so skilfully treated generally, as to invite, and deserve, a little retouching.

There is a picture, a novelty in a Demerara newspaper, drawn, engraved, and almost finished in the best style. Those lights and shadows consist in a masterly command of detail on a novel subject.

As the shadows "bring out the picture," they may as well deserve our primary attention, and possibly a little "touching up" may be an advantage to all concerned: it may impart firmness, or should not be touched. Men who are interested in this picture will give precedence to the shadows when considering it. We thus find ourselves in the same boat without the possibility of presumption.

This picture has a title, or name, "The Gill's Process." We proceed at once to abandon metaphor, to arrive at some of those conclusive facts which are recorded in that elaborately skilful report on this said process.

It is the report on a first effort with a decided novelty. Its details may not be lively to the vulgar taste; they must be devoid of that flowing force of habit which distinguishes long practice. Every effort may be cautiously tentative, until we see those who conduct the experiment improving by practice. They are perfectly familiar with the old process, in fact, none know it better; now they are on a path hitherto untrodden by them, and accordingly watch for and record everything as they pass along, to become so many possible landmarks to help them on their next journey, if facts should happen to invite them, or they might qualify rejection.

Their first day at this work, was but the remaining half a day, and this their first attempt to treat the cane-juice by a new process was, no doubt, distinguished by cautiousness, if not hesitancy, and great circumspection. Occasional omission could naturally beget fermentation, then acidity followed, which had to be corrected by adding the miserable lime, thus unintentionally laying the foundation on which molasses is built. From this, and more, it is clear that as we succeed in preventing fermentation by this process, so may we prevent molasses by avoiding the necessity for lime. This valuable lesson was practically enforced the next day, when the process was carried out in its integrity; no fermentation permitted, no

acidity annoyed them, and no lime used, because none was required throughout that day, although some 15 or 16 thousand gallons of cane-juice were that day clarified. Here was silenced the vulgar error that it is impossible to make sugar without lime; and at the same time the value and importance of this process were distinctly established to supersede its pernicious use.

It were well if lime in cane-juice did no more than correct acidity. Lime also dissolves those well-known impurities which are in cane-juice, to accumulate, entangle, combine with, and rob the planter of almost as much sugar as he sells. It must be but a poor consolation to gain molasses at the expense of sugar.

This was no laboratory experiment. In that day and a half they worked over no less than 23,200 gallons of cane-juice, and they realised 19,802 lbs.,* or 54 per cent. of the polariscopic reading of contained sugar, filling ten hogsheads and four barrels. This large experiment was undertaken at Zealandia, Wakenaam, one of the extensive plantations of Quintin Hogg, Esquire, in Demerara. The trial was conducted by Mr. Bellairs, whom report places in the front rank of the best sugar-makers in the West Indies; also Mr. Charles Williams, the sugar chemist on Mr. Quintin Hogg's estate, BelAir; and Mr. W. Stephenson, who has been these many years the manager at Plantation Hague, West Coast. These undoubted judges of the practical and the theoretical manufacture of sugar, as popularly understood, were careful in frequently collecting data to assist their judgment. The sceptic can consult those data with pleasure, a pleasure possibly so intense as to obscure the judgment which those judges pronounced and recorded in these words, that they "are convinced that the invention is not "without merit, and that it is capable of being modified and "converted into a valuable system of sugar manufacture, possessing as it does unmistakable elements of success." Of course the whole "report" is consistent with its part, however, distracting may appear some of those interesting, tentative details which are absorbed in this definite conclusion. It appears likely that such an opinion, from such a source, must satisfy the timid.

* This item is still incomplete as will be explained.

To the above is added: "The great drawback to the success of the experiment just over, was the imperfection of the apparatus." It must be at once admitted that such a large volume of cane-juice as that very large mill afforded, was not calculated for; and it is to be regreted that those gentlemen did not call on some mechanic to enlarge the perforations, when the "great drawback" would have disappeared.

There is claimed for this new process a greater sugar product. What are the facts? Those 23,200 gallons of cane-juice contained 36,656 lbs. of sugar, and realized 19,802 lbs., or say 54 per cent., and "the molasses filled 13 puncheons and 1 barrel, the net weight being 16,409 lbs." From anything that appears to the contrary, it is likely that the force of habit gave this gratuitous name to the drainage which flowed "as usual" from the centrifugals, reminding us of the old saw, that "he who drives fat oxen must himself be fat." They departed here slightly from their instructions, which suggested that those "drainings" should be sent at once into the pans on "copper-wall" to augment the sugar in the following charge. Possibly they desired to ascertain its saccharic value by a separate boiling, and so decide if those drainings were the old-fashioned wasteful molasses, or a rich syrup supersaturated with available sugar, capable of augmenting the total sugar product. The fact has been established that where we do not use lime when boiling cane-juice, without allowing it to ferment, we get no molasses. In point of fact, we have been repeatedly reminded that molasses is not a natural product, but an error of manufacture. Dubrunfaut, among others, tells us this in plain words, and he is admitted to have gone deeply in the manufacture of sugar. That *savant* also tells us that "the syrup in the vacuum-pan yields at first crystallisation about 50 per cent. of the sugar, an attempt to get more might induce caramelization."* Again, he confirms our experience

* One of those who successfully adopt this process, over-boiled the contents of his vacuum-pan, and so obtained a solid mass of sugar free from molasses; consequently that sugar had to be dissolved out, by adding water, occasioning delay.

when he says that "one pound of boiling water can dissolve only 5 lbs. of sugar, and abandons 3 lbs. on cooling." So then, it is clear, had there been no lime used during the first day, but the new process conducted in its integrity as on the second day, when no lime was used because none was required, those 16,409 lbs. of supersaturated drainage might have afforded 14,000 lbs. of sugar to complete the sugar-product. As it is, those casks of so-called "molasses," whenever examined, will be found lined with sugar crystals which were deposited there in abundance on the cooling of the contained drainage. As "it was not convenient" for them to boil it, the total sugar-product cannot be determined until the drainage sugar has been in the scales. All this would doubtless have been ascertained but for the design to accumulate these drainings, to determine their separate value by means of the vacuum-pan, which disposes of eight tons of sugar at a charge.

There is no occasion for fear about acidity so long as the "instructions" are complied with, which is an easy task whenever this process gets into full swing. The greater difficulty is to forget those old notions which have "grown with their growth." Whoever will may do so.

In a word, the aim is to benefit the owners by increasing the sugar product of their plantations without materially increasing the current expense of production, and we are now told that in practice this process "possesses unmistakable "elements of success." When this new process was carried out in its integrity, on the second day, the quality of the sugar was all that could be desired.* Any deviation in the treatment promptly proved that the process is not a toy to be played with. This fact showed itself in inferior sugar, which inferiority we see duly recorded. It must be regretted that it was not "convenient" to

* The "Report" throws a shadow on the quality of the sugar produced; and a competent authority has decided the question. A sample of that same sugar was sent to the well-known house of Travers and Sons, soliciting their commercial opinion. Their reply was—"The sample of Demerara crystals "is fine grocery sugar, and is worth 31 shillings for us to pay in the market "at the present moment."

decide the one great point, compared with which all else shrivels into insignificance—quality, of course, excepted. Planters cannot remain content with the play, when “Hamlet is left out by particular desire.”

Whenever those 16,409 lbs. of so-called molasses, being now clarified,* and supersaturated with sugar—known as “mother water” by chemists—may be treated for sugar, we shall find the gross product become, at least, FIVE HOGSHEADS OF SUGAR MORE THAN HAVE BEEN USUALLY OBTAINED FROM A SIMILAR QUANTITY AND QUALITY OF CANE-JUICE. Better results may be expected when this new clarifying process is in full swing, and the hitherto lost 46 per cent. of sugar—more or less, as instructions are complied with,—may be found utilised in the hogsheads.

This “report” has certainly an official air about it, yet it is not signed. It might have been difficult to get two signatures to the report of an incomplete experiment, when the object for which the experiment was so generously permitted, remained to be decided, because it was not “convenient” to throw those drainings, as desired, into the boiling pans on “copper wall.”

This immature Report of an incomplete experiment tells of “no bigoted opposition.” This must be an unnecessary assurance when we know that the decision, by available facts—certainly not by opinions—awaits the “convenience” of those able experimenters to complete the task which they have begun, and satisfactorily carried out so near to the end. Many planters are anxiously waiting for the result of such facts as may be contained in those casks of so-called molasses; whilst some are of opinion that there is no molasses in the casks. Therefore we wait for the remaining facts to complete this highly important experiment, whenever it may be convenient to afford them.

W. EATHORNE GILL.

45, South Hill Park, Hampstead.

* The “Report” tells where the slime was left behind in the tank; it laid there incapable of mischief, being coagulated and precipitated as designed.

BRITISH SUGAR INDUSTRIES AND FOREIGN EXPORT BOUNTIES.

We have been favoured with a copy of a new pamphlet on the above subject by Mr. James L. Ohlson, Secretary of the West India Committee, which contains a large amount of valuable information for all interests connected with the sugar trade, and indeed for the commercial community at large, for there are few branches of commerce which are not connected in some way or other in a commodity which stands second only in importance to corn. We may observe that Mr. Ohlson is the author of articles on Barbadoes, Grenada, and British Guiana, in the Ninth Edition of the *Encyclopædia Britannica*. The work consists of 200 pages, 8vo., and is published by Messrs. Field and Tuer, of 50, Leadenhall Street, London. Price, 2s.

THE SYDNEY EXHIBITION.

We learn from the *Queenslander* of October 18th, now to hand, that New South Wales makes a notable and a successful effort to show what she is doing in the way of sugar production. One of the several trophies in the Queensland Court is made up of sugar-cane and sugar. It stands about 20 ft. high, of a conical form. It is made up of forty cases, each holding about 50 lbs. of sugar. This sugar is taken from all parts of the colony. As the "judging" had yet to be done, any comments were deferred.

In another part of the court a second trophy of sugar was erected which is topped by a number of large glass bottles containing sugar from various plantations, and around the base are bags of sugar. In the New South Wales division a very handsome trophy of sugar in bottles is erected by the Sydney Sugar Refining Company, all the samples being of New South Wales growth. They are very fine, and include all the varieties made and sold by that company. Fiji also put in an appearance as a sugar grower. She sent several samples of a rich grainy sugar, and a bundle of sugar-canies 18 ft. long.

COPROLITES AS A MANURE.

A Suffolk country clergyman (the late Rev. J. S. Henslow) deeply imbued with a love for natural history studies, while taking a seaside holiday with his family at Felixstow, had his attention arrested by certain dark coloured stones which were plentiful in the cliffs of that part of the Suffolk coast; and under a belief (induced by his geological knowledge) that these stones might be petrified digested food of pre-adamite sharks and sea-lizards, he sent specimens to London for chemical examination. The result was favourable to his theory. Analysis brought out the important fact that these black pebbles, hitherto looked upon as worth no more than ordinary road gravel, or beach shingle, were largely composed of that ingredient so prized by agriculturists—phosphate of lime. The next steps in the history of this discovery and its application were to collect these phosphatic stones in large quantities, reduce them to powder in stone crushing mills, and then experiment with them as a substitute for guano. The success of these experiments was complete; and it may be said, in a few words, that the natural history knowledge, thus accidentally called forth in the course of a seaside ramble, has laid the foundation of one of the most important applications of physical science in relation to national wealth that the 19th century has witnessed. Already this discovery has opened out new channels for the employment of human industry and labour. Thousands of the working population in the counties of Suffolk, Herts, and Cambridge are earning good and permanent wages by digging for phosphatic stones, known agriculturally as "coprolite." Thanks to natural science and its happy application in the hands of a Suffolk clergyman, the landed proprietors in that part of the country now know that those long neglected pebbles may be exchanged for gold. They can hardly have received, up to this time, less than one million pounds sterling, as rent or royalty for coprolite digging. And the exchange of these stones, for gold on the one hand, and on the other, the conversion of these stones into bread, may be carried hereafter to an extent which no one can foresee, and reach an importance which, as the population of the world augments, we can hardly in this day appreciate.—Edw. Charlesworth, on "*Natural History as an element in School Teaching.*"

Correspondence.

YIELD OF CANE FIELDS ON HAWAII.

TO THE EDITOR OF "THE SUGAR CANE."

Dear Sir,

Capital and labour is still the cry for developing the agricultural resources of these islands, and it is a matter of wonderment to many—perhaps the unintiated—why with the heavy yields of the cane lands of this group that the former should be so slow in coming forward for investment, which, if at hand, would induce the latter. This has been the cry for some time past, and it has occurred to me, that the assertions of our cane yields, extraordinary or otherwise, should be placed before the world for comparison with the yields of other countries, that they may judge whereof we speak.

The following article from the *P. C. Advertiser* of this place on this subject will be opportune, and from the known care and experience of the writer, the same may be relied upon for their accuracy :—

"It is a long time since I have given any sugar statistics to the press. Indeed so many new fields with extraordinary yields have been reported, that we almost feel that anything less than four or five tons to the acre will hardly pay for the working ; the following will be interesting to sugar planters, though others may be able to report larger yields. Adjacent to the sugar-mill buildings of the Kohala Sugar Company lies a field of nearly 200 acres, from which the third crop is now being taken. The first crop yielded from $2\frac{1}{2}$ to 3 tons per acre, common white cane. The second crop a few pounds short of 4 tons per acre, Lahaina cane. Of the third or present crop, some time since, twenty acres had been taken off, and with a result of a few pounds less than 7 tons per acre. The manager says the prospect is that the average yield of the whole field will be 6 tons to the acre. The juice stands at 10° Beaumé. In 1876 a field of 200 acres, second or third crop, plant cane, yielded 1000 tons of sugar. In 1877, 226 acres, being

second or third crop, plant cane, yielded 1060 $\frac{1}{2}$ tons of sugar. These yields I think have all come from Lahaina cane.

"The land has not been manured, but is allowed to lie between the last cropping and replanting, about three years with cattle turned in. This year from 75 acres of 1st rattoons 3 $\frac{1}{2}$ tons per acre have been taken.

"The manager weighed 10 loads of 1st ratoon cane and found it to be 53,260 lbs., which produced 5 $\frac{1}{2}$ McOnie clarifiers of 500 Imperial, or 600 wine gallons each, and yielded 1010 $\frac{1}{2}$ lbs. to the clarifier.

"The field from which this was taken contained 91 acres, and the average yield of sugar was 1001 $\frac{1}{2}$ lbs. to the clarifier. The juice stood at a density of 10 $\frac{1}{4}$ ° Beaumé.

"The yield of sugar indicated by the above is a small fraction over 1 lb. of sugar to 10 lbs. of cane.

"Mr. Watson, of Mirlees, Tait & Watson, of Glasgow, Scotland, who has travelled extensively in sugar growing countries, says that the richest cane he has found is in Demerara, where he found cane weighing 10 $\frac{1}{2}$ ° English tons, making one English ton of sugar, which is a fraction over $\frac{1}{5}$ of a pound of sugar to each 10 pounds of cane. I do not know what was the density of the Demerara juice—probably about the same.

"Another fact bearing more upon the advantage of perfect machinery has come under my notice, which will be of interest to those engaged in sugar culture. The foregoing yield of sugar is something over 26 $\frac{1}{2}$ ounces to the wine gallon, juice standing 10 $\frac{1}{4}$ °. The machinery is quite complete, the evaporation being commenced in the open steam train and finished in the vacuum pan. Whilst in another case with entire open steam train and open fire, with juice standing at 10°, the yield was but 19 ounces to the wine gallon. Much of the difference in the yield was no doubt due to the difference in the machinery, though probably not all.

"The latter standing $\frac{1}{4}$ ° lower would not yield quite as much under the same favourable circumstances, but the difference in a crop of 1000 tons would be enough to go far towards supplying the more perfect machinery. * * * * *

"As the yield of the juice cooked in the vacuum pan above named was so much greater than juice of nearly the same density cooked in the open train, by steam and open fire, the difference in favour of the vacuum pan being full 37 per cent., it would be interesting to hear from others who have had experience what their observation has been in this matter. The vacuum pan, it is conceded, will give a better yield and lighter colour than the open train, and an approximation, even, to the actual gain by its use would form reliable data to guide the planter as to the expediency of substituting it for the less expensive open train. Facts tending to show the advantage of the one over the other will be useful to our planters, and I hope that any such may be given to the press for the public benefit.

"Truly yours,

"S. N. CASTLE."

Since the above was published, other reports have been given of large yields, but as no figures for reliable data are at hand to show the same, I do not include them.

It would favour many readers of your magazine here, if writers from different parts will give through your pages a few data for guidance as suggested by the foregoing article.

Yours truly,

THOMAS G. THRUM.

The *Prague Geschafts Zeitung* states that Professor Loewen, of Breslau, has discovered a process whereby the employment of lime and animal charcoal can be dispensed with in the manufacture of beet sugar. By one single operation a perfectly clear and colourless juice is obtained, which yields crystallized sugar direct upon evaporation. Scarcely any molasses is left behind, the sugar in the juice being almost all recovered in the shape of crystals without appreciable loss. This discovery is considered likely to effect a perfect revolution in the process of beet sugar manufacture.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

4761. DUGALD MAC EACHRAN, of Greenock, in the county of Renfrew, North Britain. *Improvements in the manufacture of sugar and saccharine syrups, and in the apparatus to be employed therein.*

4795. JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, Middlesex. *Improvements in or connected with centrifugal machines employed in the manufacture of sugar.* (A communication from Albert Fesca, of Berlin, Germany.)

4831. JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, Middlesex. *Improvements in the preparation and treatment of saccharine substances and compounds, and in the apparatus employed therein.* (A communication from Moriz Weinrich, of Vienna, Austria.)

4995. JOHANN KROOG, of Halle-on-the-Saale, Prussia. *An improved filtering apparatus.*

ABRIDGMENTS.

1769. HENRY EDWARD NEWTON, of 66, Chancery Lane, Middlesex. *Improvements in the manufacture of filter plates.* (A communication from A. L. G. Dehne, of Halle-on-the-Saale, Germany.) This invention consists in the manufacture of filter plates by employing molten metal (such as tin, zinc, lead, iron, &c.,) as a binding material, for disintegrated filtering substances, which will not form a fusion with the melted metal, such as ashes, coke, slag, charcoal, gravel, and other similar materials.

1783. FRIEDRICH CARL GLASER, of No. 92, Linden Strasse, Berlin. *Improvements in the manufacture of sugar.* (A communication from F. Schmalbein, of Cologne, Prussia.) This is a process for obtaining sugar in cubes, blocks, flat cakes, and prisms; it is, briefly, as follows:—The material composing the loaves is produced in the ordinary manner, filled into small conical moulds, having proportionately short apexes, and then treated as usual, until it is carried to the filtering batteries. There the loaves are deprived of the greater part of their moisture, and then turned out of their moulds, not to be taken to the drying room, as hitherto, but to be delivered in this undried state to the machines, which cut them into blocks, flat cakes, or strips. These cut, and still moist pieces, are then dried in a steam or hot-air drying apparatus, or in ordinary drying rooms, after which they may be delivered to the trade, or previously cut into cubes or prisms. By these means, the internal structure of the sugar is kept intact, and the cubes, &c., are very perfect.

1869. ALEXANDER SCOTT, Jun., JOSEPH DUNCAN SCOTT, and THOMAS ROBERTSON OGILVIE, of Greenock, in the county of Renfrew, North Britain. *Improvements in purifying saccharine substances.* In carrying out this invention in the case of saccharine substances containing comparatively large quantities of potash or other bases or their salts, the said substance, in the condition of a syrup, is run into a closed cylindrical iron vessel, furnished with stirring gear, into which has been previously poured a suitable quantity of alcohol, mixed with sulphuric acid. The mixture is stirred for about an hour, and the base will be precipitated and fall to the bottom in the form of sulphates; the liquor is left at rest for about six hours. The supernatant liquid is then decanted, and the remaining liquor obtained from the precipitate by filter press or other known means. The salts are then submitted to heat, to recover any adhering alcohol. When the liquor thus obtained contains further organic impurities precipitable by lime in presence of alcohol, it is run into a vessel similar to the first, and therein mixed with as much lime as will impart a slight alkaline reaction. The liquor is left at rest, and decanted and separated as before. Instead of, or after this second process, when the liquor contains impurities not precipitable by lime, a third process is employed. The liquor is run into a mixing vessel similar to those above-mentioned, and diluted with water and sufficient lime (say about four parts by weight of newly slaked lime to every ten parts of undiluted syrup) is added to form tribasic sucrate of lime with the sugar present. The sucrate of lime, after decantation of the supernatant impure liquor, is washed with alcohol or water, and, after separation of the adhering alcohol, may be used for the defecation of saccharine juices, or the sugar may be separated from the lime by any known means. Another process may be substituted for that first mentioned, if the substance to be treated is considered not to require treatment with sulphuric acid. About twice or thrice its volume of alcohol of a strength of 35 to 40 per cent. is added thereto, and, after well mixing, a sufficient quantity of lime is added to form tribasic sucrate of lime with the sugar present. The mixture is well agitated, until the sucrate separates in a granular condition.

1902. CHARLES HEISCH, of Mark Lane, London. *An improved filtering block.* This block is formed by mixing ground pumice stone with pitch and tar, and after moulding the same, it is burnt, leaving nothing but a filtering block of pumice stone and carbon. Powdered wood or animal charcoal may also be added in the mixing of the composition.

FRENCH.

131307. LEGRU. *Manufacturing and treating saccharate of lime.*

131316. DE LOYNES. *Using compressed air for working juice pumps.*

131389. MAHOUDEAU. *A turbine for decolorising sugar by steam.*

131473. MULLER. *A diffusion vat for sugar works.*

GERMAN.

8157. G. C. W. BELCHER, of St. Louis, Missouri, (U.S.) *An apparatus for filtering solutions of sugar and other liquids.*

8175. J. W. KLINGHAMMER, of Brunswick. *A hepsometer, or apparatus for the boiling process in evaporating in vacuo.*

8216. A. ZENISEK and C. SCHMIDT, of Dobrowitz (Bohemia). *Obtaining sugar from the syrups and molasses of beet and cane sugar works.*

8311. J. W. KLINGHAMMER, of Brunswick. *Obtaining dry lime of molasses with but little lime.*

ITALIAN.

9. E. RUELLE, of Paris. *A continuous rotary kiln for reviving animal black and other substances.*

74. M. WEINRICH, of Vienna. *Preparing and treating saccharate of lime (of molasses or syrup) by the previous formation of a compound of molasses with the lime in the shape of sand, and by macerating the latter with alcohol.*

75. F. LOEWIG, of Dresden. *Obtaining beet and cane sugar, molasses, and other residues, and reviving at the same time the alumina spent therein.*

AMERICAN.

221806. AUGUSTE A. GOUBERT, of New York, Assignor to the F. O. Matthiesen and Wiechers Sugar Refining Company, of Jersey City, New Jersey. *Improvement in centrifugal liquoring apparatus.* The invention consists in the combination of a sugar mould with a liquoring box provided with a clamp or clamps, whereby the box may be clamped upon the mould prior to their deposit in the basket of the centrifugal machine.

221807. AUGUSTE A. GOUBERT, of New York, Assignor to the Matthiesen and Wiechers Sugar Refining Company, of Jersey City, New Jersey. *Improvement in centrifugal liquoring apparatus.* This invention consists in establishing in the outer portion of the basket a series of cells, separated from each other by vertical walls projecting radially from the rim of the basket towards the spindle, and provided at the top with a removable annular cover, composed of two or more pieces. The sugar moulds are deposited loosely in the cells, and their outer open faces bear against a quadrangular frame, to which a perforated diaphragm is fixed. This frame is loosely placed in the mouth of the cell, adjoining the rim, and has its outer bearing upon a gasket of elastic material affixed to the inner face of a shoulder, the sides of which are formed by projections from the division walls, the bottom by an upward projection from the floor, and the top by a bar extending across the upper outer end of the cell. An annular collecting chamber is provided beneath the floor of the basket, into which any excess of liquor remaining in the basket can be drained.

221893. AUGUSTE A. GOUBERT, of New York, Assignor to the Matthiesen and Wiechers Sugar Refining Company, of Jersey City. *Improvement in*

apparatus for liquoring sugar in centrifugal machines. This is a device for simultaneously, by one motion, pressing the liquoring boxes outwards against the sugar-moulds, so as to prevent the escape of the white liquor otherwise than through the sugar, and by the reverse motion freeing the moulds so that they can be withdrawn from the machine. The boxes are fixed to a diametrically or vertically expanding chamber arranged round the spindle, filled with a fluid and provided with a moveable plunger which, when forced into the chamber, causes the fluid to expand the same and press the boxes outwards against their moulds, and when withdrawn retracts the expansible parts of the chamber and releases the moulds.

221894. FRANZ O. MATTHIESSEN, of Irvington, New York. *Improvement in centrifugal liquoring apparatus.* This is a device for so packing the sugar-moulds in centrifugal liquoring apparatus that the liquor can only escape through the sugar. The floor of the basket is provided with packing strips of soft rubber, upon which the inner end of the bottom of each mould rests; and the inner edge of the top of each mould is provided also with packing slips, which are affixed to the under side of an annular plate, which rests upon vertical standards affixed to the floor of the basket, and being firmly screwed thereto makes a tight joint with the moulds and prevents the escape of liquor over the top of the same. The vertical interstices between the adjacent moulds are closed by means of a packing strip affixed to the outer edge of a sliding plate moving in a radial path between suitable guide walls fixed to the floor of the basket.

221895. FRANZ O. MATTHIESSEN, of Irvington, New York. *Improvement in centrifugal liquoring apparatus.* This is a device for simultaneously drawing the sugar moulds inwards tightly against elastic gaskets secured to the outer open faces of a series of stationary cells which communicate severally with the central reservoir of the machine. This arrangement also allows no liquor to escape otherwise than through the sugar in the moulds. A cam-wheel, operated by worm gear (the worm extending up through the hollow spindle of the machine), is provided with slots, in which work cam-pins, each of which carries a frame extending round a sugar mould. The slots in the cam-wheel are so arranged that when it is caused to revolve in the proper direction the pins draw the frames and the moulds inwards tightly against their respective cells.

221896. EDWARD E. QUIMBY, of Orange, New Jersey, Assignor to the F. O. Matthiessen and Wiechers Sugar Refining Company, of Jersey City, New Jersey. *Improvement in centrifugal liquoring apparatus.* This invention has the same object as the foregoing devices, and consists in forming the inner open faces of the moulds upon an incline, the top of the mould being made deeper than the bottom, and in providing a series of stationary cells in the central portion of the basket corresponding in number with the moulds,

the open outer faces of the cells being outwardly and downwardly inclined upon an angle corresponding with that of the inner faces of the moulds, so as to make a tight joint therewith.

221897. EDWARD E. QUIMBY, of Orange, New Jersey, Assignor to the F. O. Matthiessen and Wiechers Sugar Refining Co., of Jersey City, New Jersey. This invention consists in making the sides of the liquoring boxes tapering from top to bottom, and in providing inclined seats for the inner edges of the top, bottom, and sides of the liquoring boxes upon the outer edges of the top, bottom, and sides of an inner circle of stationary cells, the sides of which are formed by the inner portions of vertical walls extending radially inward from the periphery of the basket, so that the tapering boxes, when pressed fully down, are respectively wedged tightly against the inner edges of the top, bottom, and sides of the sugar moulds, and against the inclined seats formed by the stationery cells, the top of these cells being formed by an annular plate, which also is provided with a crank button for lifting or holding down each liquoring box.

221898. EDWARD E. QUIMBY, of Orange, Assignor to the F. O. Matthiessen & Wiechers Sugar Refining Co. *Improvement in centrifugal liquoring apparatus.* This device is similar to No. 221895 above noticed, but instead of drawing in the sugar moulds against the cells, the cam wheel forces the cells out against the sugar moulds, and by the reverse motion releases the same.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To DEC. 13TH, 1879 AND 1878. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS. 1879.	1878.	IMPORTS. 1879.	1878.	DELIVERIES. 1879.	1878.
London	70 ..	43	308 ..	240	283 ..	292
Liverpool ..	34 ..	21	243 ..	186	233 ..	196
Bristol	2 ..	2	53 ..	43	53 ..	43
Clyde	32 ..	33	241 ..	236	241 ..	243
Total ..	138	99	845	705	810	774
Increase..	39		Increase..	140	Increase..	36

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST NOV., FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
160	92	8	41	1	302	282	288

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST NOV., IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
980	290	35	294	217	1816	1723	1582

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	300,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	400,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	365,000 ..	405,907 ..	380,792 ..	247,175
Russia and Poland	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	50,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,365,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

The raw sugar market has continued very inactive during the month. Refiners, whose produce had declined from 3s. to 5s. per cwt. early in the month, being naturally unwilling, and we may say unable, to meet the firm attitude of holders of raw sugar and speculators. In consequence, business has been restricted, and some refineries have closed, and until after the Christmas holidays we do not anticipate any change in the situation.

The imports of the year, as compared with 1878, showed on the 13th December last, an increase of 140,200 tons, as compared with the same period in 1878.

The increase of deliveries over those of 1878, which last month stood at 44,305 tons, amounted on the 13th December to about 36,600 tons.

The stocks on the 15th December, in the United Kingdom, were about 38,100 tons in excess of those at the same date in 1878; our comparison last month gave an excess of 35,000 tons.

As we anticipated, Mr. Licht has gradually been obliged to increase his estimate of the beet crop deficiency, which he now considers will show a falling off of 210,000 tons. He may still have to add another 40,000 tons to this estimate.

Paris loaves are quoted 2s. per cwt. lower for the month, the price being about 5s. per cwt. higher than at the same time last year.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 24s. 6d. to 25s., against 25s. 6d. to 26s.; good to fine grocery, 26s. 6d. to 28s. 6d., against 27s. to 29s.; Martinique crystals, 30s. to 31s., against 31s. to 32s.; No. 12 Havana, 26s. 6d. to 27s., against 27s. to 28s.; fair to good refining Cuba Muscovados, 24s. 6d. to 25s., against 25s. 6d. to 26s.; middling to good brown Bahia, 21s. to 22s., against 22s. to 23s.; good to fine Pernambuco, 22s. to 23s., against 23s. to 24s.; Paris loaves, 31s. to 31s. 6d., against 33s. to 33s. 6d.

THE SUGAR CANE.

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VOL. XII.

 The writers alone are responsible for their statements.

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SCHEME FOR AN INTERNATIONAL SUGAR CONVENTION.

Under the above title the Central Committee of Sugar Manufacturers of France have issued a pamphlet of forty-two pages.

The introduction explains how the French Manufacturers' Committee have for many years demonstrated the existence, in most European countries, of export bounties on raw or refined sugars, while no such premium is obtained on French indigenous or colonial raw sugar. The Committee had constantly striven to obtain the suppression of these bounties. From the excess of the evil they trust that good may now come, the Austrian bounty having become so considerable, and so much in excess of those obtained in other countries, that the sugar producers in Holland and Belgium, together with the refiners in France, are now unanimous in demanding an international sugar Convention, which should have for its object the suppression of all bounties, and the application of a countervailing duty to any sugar which might still continue to receive one.

The British colonial producers and refiners,—as unprotected as the French producers, and suffering as much as they,—had moved their Government to institute an enquiry, and to seek for some means of putting an end to so vicious a state of things. This enquiry had been commenced, and delegates from the French Raw Sugar Manufacturers' Committee had been examined before the Commission in London. Never before had all parties been so disposed to come to an agreement; which would, indeed, have been

already entered into, were not the intervention of the Governments indispensable. The Committee had, therefore, considered it their duty to communicate these favourable circumstances to their Ministers, to the members of the French Extra-Parliamentary Commission, and to all interested in the industry.

The object of the present publication, the introduction goes on to explain, is to put forward the documents necessary to a full understanding of the situation, and to refute certain objections in reference to the establishment of a countervailing duty.

The Committee had demanded, and again demands, that the French Government should bring about, by diplomatic action, an agreement on the bases indicated. The Committee believe that the time for action has come, and urgently pray their Government not to miss the opportunity. The British Parliament was about to reassemble, and there was reason to believe that the House of Commons would shortly take into consideration the report of its Commission of Enquiry, and act upon it.

The French Sugar Manufacturers' Committee desire that diplomatic action should be taken before this occurs, so that it may be evident in England that no difficulty will be raised by the other Governments.

The documents which constitute the remainder of the pamphlet, abstracts of which we propose to give in our next number, are as follows :—

1. Petition of the Central Committee of French Sugar Manufacturers.
2. Extracts from the Minutes of the Sittings of the Committee.
3. Extracts from the Minutes of Evidence taken before the English Parliamentary Committee.
4. Declaration of the President of the Dutch Committee.
5. Declaration of the President of the Belgian Committee.
6. Petition of the Belgian Committee.
7. Statement of the Austrian bounties.
8. Statement of countervailing duties now existing in England.
9. Proof that "the most favoured nation clause" is not opposed to the establishment of countervailing duties.

OBJECTIONS TO A COUNTERVAILING DUTY CONSIDERED.

The imposition on sugars imported into this country with a bounty of such a duty as shall be the fiscal equivalent of the bounty has been objected to on grounds partly economic and partly political. We propose to show that these objections are not well founded. Premising that the interests of the consumer according to the principles of free trade require abstention on the part of the State from fiscal interference with the natural laws of competition, the question arises whether the negative action of our own State in the presence of positive action by an outside State violating within our own territory the premised conditions, is valid on economic grounds or expedient on political ones. This question has, however, been determined by both Liberal and Conservative Administrations, and negative action has been deemed neither valid nor expedient. Mr. Gladstone, in 1866, vindicated the Convention for the abolition of the foreign export bounties as the means of restoring "perfect freedom of trade in the absence of those peculiar inducements." It would, therefore, seem that in the mind of this statesman some positive action on the part of our State was both necessary on economic grounds and expedient on political ones. The present Administration in continuing negotiations for the abolition of bounties have only followed in the footsteps of their predecessors. The Government of this country having thus taken positive action against the bounty system, the advocates of the interests of the British home and colonial sugar industry are released from all necessity of arguing the abstract question as to whether export bounties granted by foreign States are or are not a national benefit. Furthermore, the Government in their attempts to abolish bounties have decided that the English consumer has no right to the artificial cheapness produced on our markets by foreign export bounties, and that the British producer must not be subjected on his own markets to competition with subsidised imports. Thus far we may proceed unchallenged as to the correctness of our assertions by all

acquainted with the official records of this question. If, then, we demonstrate that the imposition of a countervailing duty against a foreign export bounty can have no other effect upon the interests of the consumer than the abolition of the bounties would have, and will possibly have an actual advantageous effect upon the interests of the taxpayers, the advocacy of such a duty cannot be impugned as in anywise contrary to the settled commercial policy of this country. The interests of the consumer can only be affected through market prices. Starting from a normal or free trade price level, the operation of a bounty to some out of many competitors on a common market will either leave unaffected or lower the normal price level. If such normal price level be unaffected, the whole amount of the bounty will have been retained by the bounty recipients to equalise their inferiority as producers as compared with the other competitors. If, however, the price level be lowered, the measure of its decrement from the normal level will correspond to the amount which the bounty recipients are able to sacrifice on the market, and the measure of their inferiority as producers will correspond to the amount of the difference between the actual bounty and the actual decrement from the free trade price level. Now test the operation of a countervailing duty in either case, in order to see whether such duty could by any possibility raise prices above the free trade level. The first of the two alternatives will supply the severest test. Competitors with the bounty necessary to them to its full amount, find themselves subjected to a customs' duty, whilst competitors without a bounty enter the market duty free. Can such bounty recipients recover the duty or any portion of it from the consumer? Certainly not; because prices would be raised above the free trade level, yielding a profit higher than the natural one to all competitors entering duty free, which profit, by the inexorable laws of competition, would be lost on the market before it could be secured. In other words, notwithstanding the duty, prices would be adjusted by the competition of producers entering duty free, no element of the duty would enter such price adjustment, and the bounty recipients would exhaust their bounty in the payment of the duty, and if excluded be

excluded from the market for the best and soundest of all reasons, viz., that the prices, which the rest of the world unaided could take, were such as they could not: their inferiority, not the duty, would be their only prohibition. Let us examine the other alternative by assuming that the decrement from the free trade level is equal to the amount of the bounty, and thus cover all intermediate conditions. In this latter case, the bounty recipient, not having required the bounty, has had to sacrifice it in competition: but the duty prevents this by exhausting his bounty: prices rise to the normal level: competitors with and without a bounty are equally relegated to a competition upon the basis of their minimum cost of production. It is therefore clear that a duty operating against a bounty is paid out of the bounty, and is not incident upon the consumer. Under no circumstances could the duty be incident both on the bounty and on the consumer. The objection therefore that such a duty taxes consumers for the benefit of producers is not well founded: on the contrary, such a duty taxes foreign tax payers so long as they are willing to be so taxed. The recipient state treats as revenue the tribute which flows from the revenue of the bounty-giving state. The bounty-giving state cannot complain: *Volenti non fit injuria.*

W. P. B. S.

(*To be continued.*)

GREAT MEETING IN BARBADOES ON THE SUGAR BOUNTY QUESTION.

A large meeting was held on the 25th November last in Barbadoes, not only to hear what the workmen's delegates, who had recently arrived, had to say on this question, but to afford them an opportunity of hearing what those interested there in the matter had to say. Among those present upon the platform were the two workmen's delegates, Messrs. Peters and Monteith; Dr. Grant E. Thomas, ex-President of the island; the Hon. J. G. Grant, (Member of Her Majesty's Legislative Council); Hon. G. C. Pile, Speaker

of the Assembly; Conrad Reeves, Esq., Barrister-at-Law and M.C.P.; J. T. Greaves, Esq., M.C.P.; J. F. Marsh, Esq., M.C.P.; John Connell, Esq., M.C.P.; J. C. Richards, Esq., M.C.P.; Henry Pilgrim, M.C.P. and President of the Agricultural Society; J. R. Phillips, Esq., M.C.P.; Jas. A. Lynch, Esq., (Vice-Chairman of the Chamber of Commerce); E. G. Louis (of Messrs. Louis, Son & Co.); Benjamin T. Bovell, Esq.; L. Nurse Bowen, Esq.; J. P. Mason, Esq.; George Sealey, Esq.; John Innis, Esq.: Dr. Bowie Walcott; S. F. Hewitt, Esq., Barrister-at-Law; Mr Cameron, of Demerara, and others.

The Hon. J. G. GRANT was voted to the chair, and said: Gentlemen,—As to the object of the present meeting, you are all, doubtless, aware that it has been convened for the purpose of introducing to the public of this island the two delegates who have recently arrived here from the Working Men's Association of the mother country, and whose mission is to enlist our co-operation in the efforts which are being put forward by themselves and those whom they represent, in obtaining from Parliament some relief from the oppression which exists at present in the mother country, in consequence of the bounty which is given by certain continental countries to the producers of beetroot sugar. (Hear, hear.) Now it must be pretty evident to all who have studied the subject carefully, that where a bounty is given, whether it be to the producer or manufacturer of any article, such persons must necessarily enter the markets where that article is saleable under better advantages than those persons who enjoy no such privilege. This is precisely our case at the present moment, and you must at once see the disadvantage which attends those sugar-producing countries which receive no bounty and who, thus unequally, enter the market with the bounty-fed sugar of other countries. (Hear.) Now, all that is proposed is that those countries who give a bounty should be invited to withdraw it, or, on the other hand, that a countervailing duty should be imposed by the British Government so that the scale might be equally poised between the competitors. It might be considered, gentlemen, that in asking for the imposition of a countervailing duty, we are encroaching upon the principles by which free trade is governed. I say that it is not so, because I apprehend that the primary principle of free trade is that men should have the same facilities, and enter the market with their goods upon equal terms. (Hear, hear.) But under present circumstances can a man who enters the market with sugar which enjoys a bounty be said to have entered upon equal terms with the man who enjoys no bounty? (Hear, hear.) Does not the former possess a great advantage over the latter? Gentlemen, let me impress upon your

minds that this question is not one that merely affects the sugar producer or agriculturist. (Cheers). It is a question that affects not only the sugar producing colonies of the Crown, but a question which, in a colony like ours, where we have only the sugar cane to depend upon for our support, affects the vital interests of every individual in it. We also, gentlemen, have been told that a considerable number of the working classes in the mother country has been seriously affected by it. (Cheers.) And, gentlemen, those people, in a body, have taken steps to remove the difficulty under which they lie at present. After quoting reports of the workmen's movement in England, and a letter of Mr. Kelly's to the *Times*, the hon. chairman, in conclusion, said : I have pointed out to you the object of our meeting; I have endeavoured to point out to you the several interests which are affected by the sugar bounty system. I have endeavoured to explain to you that unless that system be cancelled by a treaty, there is no hope for relief but that which must arise from the imposition of a countervailing duty. (Cheers). With these observations, I beg to introduce to your notice Mr. Peters and Mr. Monteith, who will, doubtless, address you, and from whom I am certain you will gather far more valuable information on this important matter than I have been able to give. (Applause).

Mr. PETERS, who, on rising to address the meeting, was received with great applause, said : Mr. Chairman and Gentlemen, the very numerous attendance here to-day is a practical illustration of the deep interest taken by the people of Barbadoes in this important question, and will be of material importance in bringing about a settlement of this very serious question. I am deeply sensible of the great kindness shown to myself and colleague, and accept it as a compliment to that large bodies of British workmen whom we have the honour to represent, and who are, as well as yourselves, entirely dependent on the prosperity of the British sugar industry. Since our last meeting at the Agricultural Hall on Tuesday, I have received the intelligence, that, since our departure from Great Britain, large and important meetings have been held in some of the large centres of industry that are not directly interested in this special question. I allude to such places as Leeds, Hull, and Bradford, where resolutions condemning the bounty system have been unanimously carried, calling upon the Government to devise measures for the effectual prevention of the continuation of this obnoxious bounty system. And I am further pleased to remark that a deputation composed of representatives from the various trades of Leeds, accompanied by the President of our Association, has waited upon Mr. Barran, one of the members of Parliament for their city, to discuss the question, and in the honourable member's reply, he has blamed the Government for not taking more effectual steps to remedy the bounty system, and promised the deputation that, after a strong protest has been made by our Government to

the bounty-giving powers, he is prepared to support a measure for the effectual suppression of the bounties by means of a countervailing duty. This, gentlemen, is important, because we know Mr. Barran to be a free trader and sound on general economic points. Had those statesmen who have confounded our movement with the movement for "reciprocity," or limited protection, taken more than a superficial view of the case, they would have found that the sugar industry of Great Britain and her colonies suffered from an unnatural and special grievance, and therefore required special attention and legislation. Great Britain to-day suffers from great depression of trade, which has lasted for the past five years, but this depression can be traced to causes different to the one that affects our industry. The date of the commencement of the decline of the sugar industry can be put down to many years previous. Twenty years ago, Great Britain refined 150,000 tons of loaf sugar, either for her own consumption or export. To-day that trade has entirely disappeared, and the refineries have been turned into wool warehouses, and some into model lodging houses, whilst a few are remaining with their machinery silent, their chimneys smokeless, their operatives unemployed, all of which stand as a protest against our Government for allowing an old and valuable industry, by the artifice of continental nations, to be thus wrested from us. Sir, had this been done by natural causes, it would be useless for us to complain. But, on the contrary, we should turn our attention to some other branch of industry. When we know that our means of livelihood are thus taken away from us, without any compensatory benefit to the nation, it is our duty to press our Government to give us that free trade competition in our home markets that is the inherent right of every British subject. The loss of the loaf sugar trade can be entirely attributed to the operation of the bounties. And it has been stated in evidence before the Select Parliamentary Committee appointed to investigate into our grievances that a bounty of 6d. per cwt. upon moist refined sugar would lead to the destruction of our only remaining branch of the trade. If the bounty system is allowed to continue, what guarantee have we that those governments will not attack us in this branch as well as the loaf trade? If a fair and just settlement of the sugar trade were brought about, those refineries standing would soon be in active operation. Again we have at home millions of capital and thousands of skilled workmen unemployed that could be placed advantageously in British Guiana and the West India colonies. We have lent hundreds of millions to foreign countries, some of which we shall never see again. And here we have a safe and profitable investment for British capital if assured of honest competition. The interests of Great Britain and those colonies are identical. And to refuse the wealth which these possessions can pour into our market at home, is an unwise policy of any Government. I may

be met with a reply that the purchase of nine millions worth per annum of beetroot sugar from continental Europe enables those countries to buy from us articles of British manufacture. But, sir, if the equivalent of the price be paid by British goods, the profits on the transaction are shared equally by the foreigner. But, I have yet to learn that such is the case. I know from sad experience, having been connected for many years with large bodies of workmen, that Europe refuses to a great extent our productions by their high and prohibitory tariffs. If these nine millions had been expended with these colonies, then our countrymen would have been sole participators in the profit, and British labour would have been employed on both sides of the water. The effect of the bounty, gentlemen, not only lowers the price of our goods, which becomes adjusted by competing State subsidies instead of natural advantages, but displaces in our market what you would produce, and also creates uncertainty as to the future of our industry, which must materially affect the trade. We see now that France, Holland, and Belgium are willing to come to a Convention with Great Britain for the abolition of their bounties; therefore, the other bounty-giving Powers must be enforced to do the same. If a countervailing duty were levied against their bounty-fed goods entering our markets, it would soon bring them to their senses. Great Britain is the largest consumer of sugar, and there are no other markets for the over-production of Europe. The duty would neutralize the effects of the bounty upon our producers, and would only act upon the foreign exporter as if there were no bounty or duty. The bounty-giving nations would soon see the folly of presenting us with a tribute that could not assist their producers in a competition with us. This state of affairs has been tried to be arrived at by both Liberal and Conservative Governments. They have shown in their negotiations with these countries for the abolition of these bounties that the British consumers or the foreign exporters have no right to the bounties, and that which has been attempted by repeated remonstrances, diplomatic negotiations, and international Conventions, would be arrived at. Richard Cobden, in one of his great speeches, affirmed the principle that "consumers had no right to artificial cheapness," but said, "give us corn and plenty of corn. I care not whether it becomes dearer or cheaper, but give it to us at the natural price of production." I say Cobden was right, and the events since the repeal of the Corn Laws have proved it. If he were alive to-day he would say the same upon the question of sugar, and I have been told by gentlemen that worked with him in that great movement, that if he were alive to-day, he would have been upon our side, striving to bring about the suppression of the bounties. I am of opinion that if the bounties were abolished, and free trade competition given to our colonies, confidence would be restored, newer appliances would be in

use, and that sugar in the course of a few years would become as cheap or cheaper than what it is through the operation of the bounties. The history of our sugar trade for the past twenty years is a sad one for the cane producers. We find that Europe increased her exports to Great Britain since the year 1862 from 40,466 tons to 281,538 tons in 1876. Whilst sugar from our West Indian possessions was in 1862 193,238 tons, and in 1876 it was 208,865 tons. Thus, for the West Indies to remain stationary, in the face of an enormously increasing consumption, means a sad loss. Mr. Gladstone's Government was fully alive to the importance of this question. And in 1864 France, Holland, Belgium, and Great Britain, entered into a treaty engagement for the suppression of the sugar bounties. Austria and Germany at that time were not important factors in the exportation of sugar. Why I am speaking to you, gentlemen, of the treaty is this: that treaty contained a clause which stipulated for, and affirmed, the principle of a countervailing duty. The four high contracting Powers agreed that where sugar was exported from one country to another with a bounty, a surtax should be imposed against the nation infringing the articles of that Convention. This, I believe, gentlemen, was characterized by Mr. Gladstone, from his place in Parliament, as a fair and just settlement of the sugar question. That treaty held good for ten years, but that clause was never put in force. The treaty expired, and we have now no treaty engagements with any Power upon the sugar question. It is, therefore, the duty of our Government, as the evil effects of the bounty system have become now deeply intensified, to immediately summon the bounty-giving Powers to a Convention upon the basis of a countervailing duty clause, thus restoring to us free trade and fairplay. The British sugar trade requires no protection. With your natural advantages here, of sun and soil, you can produce sugar as cheap or cheaper than any part of the world. The sugar production of Europe commenced with protection, exists with protection, and, I am afraid, cannot be sustained without protection. The workmen at home are determined to continue their agitation, until they arrive at a successful issue. I then ask you, gentlemen of Barbados, to-day to co-operate with us in carrying on our movement. We have a strong and a good case, which, when placed before the British public, never fails to succeed. And I am assured that, by our united efforts, we shall restore our industry to its legitimate level. (Prolonged applause.)

Mr. MONTEITH said: Mr. Chairman and gentlemen, it is a great honour to us to meet with so much encouragement from the great meeting of to-day to protest against the foreign sugar bounty which, if allowed to exist much longer, will simply mean ruin to all engaged in the sugar industry. I have heard from every gentleman with whom I have had the honour to converse on this subject, that the only staple trade of this island is sugar, and if

that fails what is to become of the plantations that are now covered with canes? They will go to bush, and that will mean ruin to the producers of sugar, and the rest of the branches must suffer in proportion. After the great failure of the late firm of Finzel & Co., of Bristol, which threw out of employment from 600 to 700 men that worked inside the walls, besides about 130 coopers, these men had to be supported by their trade societies, which expended in 2 years upwards of £2,300. In London, again, up to the time we left, in September last, we expended about £1,200 for our unemployed men since the commencement of the present year, with no prospect of things being any better. And I am sorry to say the prospect is the same in all parts of the country. I mention this not from any boast but from the fact that we have done all in our power as working men to relieve our unemployed; but we cannot bear the pressure much longer. (Cheers.) With these few observations, I beg to thank you for the welcome which you have given us. (Cheers.)

The Honorable G. C. FILE, Speaker of the House of Assembly, then moved the first resolution:—

“That this meeting cordially welcomes to their island the delegates from Great Britain who have been elected by their fellow workmen interested in the prosperity of the home and British colonial sugar industry, and hopes that their efforts, to secure for the West Indies free trade competition, will be crowned with success.”

And said: I am certain that every individual present to-day will join me in cordially welcoming the delegates to this island. (Cheers.) We welcome them, not as strangers, gentlemen, because it is now some time since we have known of them by report. We welcome them as fellow-sufferers with us in the matter of the sugar bounties, and as individuals who have been appointed as the delegates of that large class of English workmen, whose interests have been affected, to co-operate with us in their endeavours to bring about the abolition of that injurious bounty system. (Hear.) I am one of those who consider the question of foreign sugar bounties one that cannot be too often discussed, one that cannot too often be ventilated by every one who is interested in the sugar production of the West Indies. The first question that may be asked of us is, what do you claim? We reply, we do not claim protection, we claim merely to be put upon an equal footing with other producers of sugar. (Hear, hear.) It has been well said that the principle or theory of free trade is, that each nation should exchange with others, all commodities which each is capable of producing, whether by manufacture or by agricultural pursuits, without duties or taxes of any kind, each country having its own natural advantages, which will enable it to succeed or otherwise, in various branches of agriculture or manufacture. Gentlemen, I consider that what we are moving for is right, because we are prepared to

show that the sugar bounty is a scandalous departure from the recognized principles of free trade. (Cheers.) More than that, it might, with equal force, be said to be a duty levied upon us sugar cane producers. (Hear, hear.) Has not the Austrian producer, the principal receiver of this bounty, the power of taxing our sugar when we go into the market? Is this fair or just? (Hear.) Therefore, I consider it the duty of the British Government to adopt such measures as will remove the burden from that branch of industry which is being ruined by the false system of foreign countries in granting bounties. How can this be done is asked. We reply, by the imposition of such a countervailing duty as will be equivalent to the bounty. I think that the levying of such a duty will be fair and just, because, as I have already stated, the bounty is but a tax levied upon our sugar production at the present time. A countervailing duty has been recognised in England as regards sugar, by the terms of the sugar Convention of 1864. But I cannot refrain, however paradoxical it might seem, after my advocacy of its imposition, from questioning the probability of a countervailing duty being at all collected, because, I believe, that there would be no necessity for imposing it if England would but show a firm front in this matter, and let the other powers see what she intended doing, if the sugar bounty were not removed. (Cheers.) If they disregarded this, then I say—the countervailing duty would be collected in England and the proceeds thrown into the general revenue, thus relieving the body of taxpayers, while it lasted, of a portion of their burdens. (Hear.)

The Honourable J. G. GRANT informed the meeting that he had to attend a Committee of the House of Assembly, on the bounty question, and Dr. GRANT E. THOMAS was voted to the chair.

Mr. FILE: It is the opinion of Mr. Walpole, gentlemen, that it is hopeless to expect any settlement of this question so long as the abolition of the bounty system depends on the meeting of Conferences. Therefore, we must not waste our time in trying to settle this question by Conferences, we have rather to impress upon the British Government the necessity of levying a countervailing duty, at once, and depend upon it, gentlemen, Conferences will soon enough follow and the bounty will be removed. (Cheers.) It may be asked what effect will this duty have upon the price of sugar? I have no doubt, along with many others, that, in the first instance there will be a rise. But that price, whatever it might be, will come to what I might call a free trade level. But, even supposing, for argument sake, that there should be a low price, I contend that it would be much more satisfactory to know that no such artificial agency as now exists was employed. I feel certain, Sir, that the working classes of England—our fellow-workmen in this cause—would not refuse to pay a small advance in the price of their sugar, so long as they were insuring justice to their

fellow-workmen all over the sugar producing colonies of the world. Sir, it has truly been observed, that if one trade suffers, kindred ones, more or less, are affected; so it is in our case. If the sugar cane be driven out of the market, gentlemen, I ask you, will not the consumers in the mother country be entirely dependent upon the continent for their sugar? (Cheers.) Gentlemen, the continent is subject to changes of season; so are the tropics. But while the seasons are variable in the tropics and lead to a frequent failure of the sugar cane crops, yet the question might be asked whether all the sugar cane producing countries of the world are liable to bad seasons at the same time, for you will find that the sugar cane production extends far and wide. Such cannot be said for continental countries. Now, gentlemen, I think we are entitled, as British subjects, to put forward our claims for relief. (Cheers.) It has been well said, that this not a question which affects us alone. It affects every cane sugar producing colony. (Hear, hear.) More than that. It affects the entire community of the mother country (Cheers.) Is it not, therefore, our duty to do all that is in our power to aid these gentlemen who have come forward on behalf of the general body of workmen in England to help us. Gentlemen, I trust that the efforts which are now being put forward in what I might call real free trade principles in the matter of sugar will be crowned with success. (Applause.)

Mr. T. B. EVELYN said: Mr. Chairman and Gentlemen, it now devolves upon me to second the resolution. I do most heartily welcome those gentlemen who have come amongst us as delegates from the working classes of England. (Cheers.) But, gentlemen, let us bear in mind that it won't do simply for us to welcome them here, however cordial that welcome might be, but we must do something more. It is our duty to send them back with some reliable statistics to aid them in furthering their movement. (Hear, hear.) Now, gentlemen, it is quite clear to my mind that so long as this iniquitous foreign sugar bounty system continues, Barbados cannot hold her own. It will not do to take one or two favoured estates as affording a correct idea of our average sugar crops, but rather to look at the island as an entire plantation. And when we do that, gentlemen, I find that we cannot cultivate an acre of our cane land at a less cost than £20. I say, for instance, if a man has under cultivation 100 acres, and he incurs all the expenses properly incident thereto, that it will involve him in an expenditure of £20 per acre. It has been estimated that we annually place under cane cultivation about 35,000 acres, so that, gentleman, you will clearly perceive the expense for cultivation is something like £700,000. Now, looking to the average yield, we may say that it does not exceed 1½ hhds. an acre. Therefore, although we might be told that our sugar crops reach 52 and

sometimes 53,000 hhd.—which, by the way, has not been the average crop for the last 10 years—if we sell it at 18s. to 20s. per cwt., as we have been doing this year before the late rise, it is impossible for Barbados to hold her ground at such a disadvantageous price, because at that figure a hhd. of sugar would realize but £12 nett, and 52,000 hhd. giving an aggregate sum of £630,000 would leave a loss of £70,000 on the sugar alone. It has been said that Barbados enjoys numerous advantages over other colonies, but gentlemen, if Barbados cannot hold her own in this struggle, then it stands to reason the others will be worst off. (Hear.) The resolution on being put was unanimously carried.

[NOTE.—Mr. T. B. EVELYN explains his interesting statistics in a subsequent letter, thus:—With reference to the remarks I made at the public meeting on the 25th inst., I meant to convey that there was a loss of £70,000 on the sugar cultivation of the Island, basing my calculations on the sugar alone, as being affected by the bounty. But to avoid misapprehension, I must go more into details as regards the profits of estates generally.

The proceeds of what is termed offal crop, comprising molasses and vegetable crops, with rent of land, may be estimated thus: 1½ hhd. sugar per acre as a fair average for the island would give 1 pun. molasses to the acre or 66 gallons to the hogshead, the price of which at an average of 16c. per gallon and \$4 for the puncheon, (the cost of which puncheon is included in the expenses of £20 per acre, as estimated the total expenses are of an estate,) would be \$20 or £4 per acre,—the amount realized by vegetables, land, rent, &c., would be about £2 per acre, making a total of £6 per acre for the offal crop, which on an average of 35,000 acres planted annually, would realize £210,000—deducting the £70,000 loss on the sugar will leave £140,000. The calculation is taken on sugar at 18s. and 20s. per cwt., which will give £12 per hhd. or £18 per acre, as the average of this year's crop before the late rise. Now if sugar rose to 22s. or 23s., that, after deducting expenses would leave 17s. to 18s. nett, a little more than a farthing per pound dearer and amounting to £15 per hhd., taking a hhd. at an average of 17 cwt. nett, this would give £3 per hhd. or £4 10s. per acre in excess on 35,000 acres producing £157,500, which added to £140,000 would be £297,500 to the credit of the island; taking the legal rate of interest, 6 per cent., this latter sum would represent a valuation of £4,958,000 for the whole acreage of 106,000 of the island, or between £46 and £47 per acre, a rather moderate sum for an old settled colony. It is evident were the sugar bounty abolished, we could hold our ground and compete with any sugar growing country in the world, whilst on the other hand, were the price per hhd. to be only £12, the island could not possibly continue to grow sugar at that figure.]

Mr. JAMES A. LYNCH then moved the following resolution :—

"Resolved,—That this meeting recognises with satisfaction the Delegation from the large and influential association of the working men of England from whom it comes, as showing a feeling of sympathy and reliance well calculated to promote the interests of these colonies."

And said : This meeting affords the strongest and most complete evidence of the bond of sympathy which exists between the working men of England (whose delegates we take pleasure in welcoming here to-day) and ourselves. (Hear.) They are suffering from the same oppressive sugar bounty system as ourselves. Gentlemen, Mr. Peters speaks of the other colonies, and the probability of their abandonment of sugar cultivation if something be not done. So far as Barbadoes is concerned in the matter of sugar industry, when compared with other West Indian colonies, their case is far worse. But they have this advantage over her. While they grow cocoa, and can look upon other resources by which they can supplement their cane sugar proceeds, it is in Barbadoes the sugar cane, and nothing else,—the cultivation of which, gentlemen, is a hard struggle with the planter to keep up. We can grow sugar in this colony much cheaper than anywhere else ; but this only proves how much more would be added to our present difficulties did we not enjoy such an advantage. It is my business to ask you to sympathise with our fellow-workmen in the mother country, and to lend them every assistance we possibly can in a cause which, if successful, will tend as much to our material welfare as to theirs. (Cheers.) We recognise them, as well as we do the Delegation sent us, with great satisfaction. (Hear.) We look upon the Delegation as a proof of what can be done by the large and important classes who have sent them. (Cheers.) It is an assurance that when the working classes of England take up a cause, that has for its object the removal of a grievance, they exert all their strength and energy in bringing it about. (Cheers.) I look upon it as an important epoch in our history when we find gentlemen sent out by the working classes of England to ask us to join them in a cause like this. (Cheers.) We cannot fail to look upon it as a recognition of an identity of our interests with those of the mother country. (Cheers.) We can feel it in a tie that will bind us more closely with her. (Cheers.) It is a tie of mutual interest. (Cheers.)

Mr. GREAVES seconded the resolution. He thought Mr. Peters had paid Barbados a high compliment in saying that the French islands would follow the course she should take in the matter. We had no other resource but growing sugar. He believed a countervailing duty would have the effect of stopping the bounties.

The resolution was then put, and unanimously carried.

Mr. PHILLIPS then moved the following resolution :—

"Resolved.—That although in this colony there are no new lands to be brought into cultivation, the production of sugar may be greatly increased by improved methods of manufacture and cultivation."

He had read somewhere that a man who could make two blades of grass grow where one formerly grew was considered a benefactor of mankind. (A laugh.) The resolution he had just read stated a fact, which he could substantiate from his own experience. There were no new or unoccupied lands in Barbados. It was that which helped to raise the value of those under cultivation, and to make them more productive by the application of labour. It was labour that gave value to land, and the delegates would see a cultivation that was unsurpassed in any country. It was a mistake to say that in old countries the soil became exhausted by constant cropping. Barbadoes was an old country, comparatively speaking ; the soil had been under cultivation for 200 years, and what was the fact with regard to the capacity of the soil to produce sugar. The return per acre now was as great as ever before. With generous treatment and in skilful hands, by good tillage, and the application of foreign manure, it was made to produce much larger crops than formerly. The young generation of planters would vie with their fathers and grandfathers ; indeed, if the latter could see the crop upon the ground at this moment it would astonish them. So much for the absurd talk of the exhausted soil of Barbados. But there was room even in this matter for improvement in the tillage and manuring of the soil. We stood more in need of improvement in our methods of manufacture than of agriculture. Especially was this the case with regard to the machinery used for crushing the cane. The windmill had had its day. The experience of the reaping of the crop of this year shewed the great need of substituting steam for wind power, for it appeared to him the seasons had quite changed of late : in the months of March and April, instead of fine breezes and sunshine for making sugar, we have calms and frequent showers, which proved very detrimental to the crop reaped this year. By improved agriculture and machinery for the manufacture of the sugar, he believed that the annual crop of the island might be increased from 50,000 and 60,000 hlds. to 70,000 or even 80,000 hlds. This was an opportunity which we should hail as the only path of safety, and promise of deliverance from the danger that threatened us. Let us assure the delegates we not only welcome them cordially, and join in their efforts with heart and hand, but we are ready to put our hands into our pockets and subscribe a purse to assist them in their expenses. (Cheers.)

Mr. S. F. HEWITT, in seconding the resolution, said the manufacture of sugar had been practised here since the middle of the 17th century, and the sugar cane had become, in commercial importance, the island's most valuable production. The sugar

works in operation numbered over 500. Of these only some 62 employed steam power, and the rest depended on wind mills. When it was remembered that every one of these wind mills occasioned each year a loss of at least 25 per cent. or more on the value of a crop, by retarding reaping operations, it would (he thought) be admitted that there was room in this direction for the employment of additional capital in the island. But to secure this capital, confidence and security were necessary. It was for this reason, as far as Barbados was concerned, that legislative enactment at the hands of the Imperial Government was desired, for the solution of this foreign export bounty system. This matter once adjusted, so that the full doctrines of free trade should reign supreme on British markets, undisturbed by fiscal advantage to any competitor, we should naturally expect the introduction of additional capital into the island for the required improvements. The delegates when they returned home would be conferring a favour on the colony if they would bring to the notice of capitalists the need there was for central sugar factories throughout the island.

Mr. E. G. Louis in moving the next resolution :—

"That this island, by reason of the advantages it enjoys, in its large population, its salubrious climate, its geographical position, can produce sugar as cheaply as any place in the world; but owing to the unfair competition with beet sugar supported by bounty, the profit upon its cultivation has diminished year by year. That this year the result of the crop has been so disastrous, that many planters have found themselves unable to continue the cultivation of their estates, and have been compelled to transfer them to the Court of Chancery to be worked until sold. It thus becomes necessary that urgent means be adopted to avert the ruin which threatens us, and this Meeting approves of a numerously signed Petition being presented to the British Parliament praying for such relief as it may deem fit."

said : I venture to think that the mission of the delegates could not have been undertaken at a more opportune moment, for, unhappily, the experience of the year now approaching its close has been such as will enable us to furnish them with information which, if it were needed, must go to show that unless some action is taken, and that speedily, to rescue us from the ruinous effects of the system of granting bounties on foreign sugar, even Barbadoes with her many admitted advantages may fail in her efforts to continue the struggle much longer. (Hear, hear.) The following figures show the extent of the beet root crops and the rapidity with which they have increased in the years I shall mention. In 1867-8 it was 672,000 tons; 1870-1, 906,000; 1872-3, 1,129,000; 1874-5, 1,178,000; 1875-6, 1,368,000; 1877-8, 1,465,000 tons. And, whenever prices encourage it, this increase of planting to which I have referred will continue to be extended. Sir, what a discouraging prospect for us is this? For us who know that by reason of our possessing advantages of soil and climate, besides a redundancy of population and an enviable

geographical position, we can, as my resolution affirms, produce sugar as cheap as any other country in the world. But, of what avail are these advantages if through the fiscal regulations of the mother country we are threatened with almost extinction? (Hear, hear.) Gentlemen, think you for a moment that this question of the bounties, with its surrounding complications, would have been understood in England to day, as it is understood, by the Member of Parliament down to the working man had it not been for the persistent agitation of the delegates and their fellow workmen, and which agitation, as we have heard from Mr. Peters, has resulted in such unlooked for and unprecedented success? (Cheers.) The time I hope may not be far distant when we shall again assemble in this hall to congratulate our several champions on having, as the result of their exertions, succeeded in obtaining for us that fairplay which, in a matter of such vital importance to our future, we, as English colonists, have a right to ask and to expect at the hands of our mother country. (Cheers.)

Mr. MASON briefly seconded.

The resolution was unanimously adopted.

Mr. H. PILGRIM in moving the fifth resolution, protesting against bounties as a violation of free trade, and advocating a countervailing duty, said it was unnecessary to prove the bounty system a dereliction of free trade principles. Much had been said on this subject by those who had preceded him. It was more to the point to speak of the facts relating to the sugar production of Barbados. It was admitted that we could grow sugar in Barbados as cheap as it was grown in any part of the world. We do not contend that sugar cannot be produced even at the low prices of this year. But it ceases to be profitable at this low price, at which the owners and others having claims on the property must go without the interest of the capital they have invested in the property. If the low prices continued for a series of years it must ruin the proprietary and mortgagees. If this state of things prevailed, it was asked—why do not the parties interested petition the Government on the subject. From time to time petitions had been drawn up for that purpose, but had not been forwarded, because the planters declared they had no faith in the willingness of the Government to redress them, and refused to sign them. But things appear now to be about to change, owing to the agitation against the operation of foreign bounties raised by the working classes of England. The character of this system began to be understood, and the injury it inflicted upon the colonies as well as the people dependent upon the sugar industry at home to be exposed. The refiners of France as well as of England have found out that it is undermining their industry, and they join now in calling for a countervailing duty to neutralize

the effect of the bounties. He had no faith in the present rise of price of sugar in the markets. It would not last throughout the year. It was owing to the unfavourable season for the beet this year. But in March and April they may put in a large breadth of beet, and with a large crop in October, the price would fall as before.

Mr. BOVELL seconded the resolution, and expressed his hearty concurrence with it, as it called upon the meeting to co-operate with the noble army of British workmen in their endeavours to abolish the ruinous system of foreign bounties.

Mr. REEVES moved the sixth resolution, and said it pledged the meeting to co-operate with the Association now in Great Britain for the abolition of the pernicious system of foreign bounties on sugar. How could such a system be called free trade? What relation had it to free trade? He himself was a free trader. He believed in free trade, but not in the foreign bounties. Other speakers had dealt with them, and explained their pernicious operation upon the trade and sugar production of Barbados. Free trade according to his idea, meant free competition. These bounties had the effect of destroying competition on equal terms. That being so, they were opposed to free trade; and that was the reason why he was there to second a resolution framed upon that principle. He was not a planter as they were. He had nothing to do personally with these sugar bounties, why did he stand up here to move a resolution condemning them as pernicious. It was because we all felt for the thousands of working people thrown out of employment by the operation of these bounties.

Mr. MARSH seconded the motion.

After a vote of thanks to the Chairman, the meeting dispersed.—*Barbados Times.*

EXTRACTS FROM *JOURNAL DES FABRICANTS DE SUCRE*,
Of January 21st.

The Ministerial declaration made to Parliament has generally met with favour, and the passage relating to reduction of duty shows that the new Cabinet does not, on this point, abandon the policy of its predecessors. "Thanks to the constant increase of the revenue, we shall be able to propose to you important reductions," said the Minister. We take note of the reassuring declaration, for we cannot for a moment doubt that sugar will be in the first rank of the products to which the reductions refer. The state of our finances permits

the realisation of this project, the receipts having justified all anticipations,—the definitive increase being 142 millions. The budget of 1879 will serve for an estimate of that of 1881, on which, according to all probability, the Minister will introduce his proposal of reduction. This measure will then rest on a solid foundation, and the financial question will be fully assured to begin with: only, and as we have so often before said, the competition will be active. We cannot, therefore, too strongly impress, on those interested, the necessity of actively maintaining their rights. The new Minister of Finance, if otherwise competent, is favourably disposed, and Mr. Wilson, his active Collaborator, is too familiar with the question not to comprehend its high importance. We do not doubt of final success, if the delegates of the sugar industry know how to bestir themselves, and if they also avail themselves skilfully of all occasions for discussion as they occur, and, notably, that on the Customs tariff, for which we have shown there is no possible solution but in a large reduction of duty.

We have said that the budgetary surpluses were 142 millions; in that which concerns sugar they are, relatively to last year, 13,288,000 francs and 3,344,200 francs according to the estimates. The receipts from sugar in 1879 was 195,864,000 francs, against 182,576,000 francs in 1878. This is a highly satisfactory result, and exhibits resources which would justify a 50 per cent. reduction of duty. If the consumption of sugar, in spite of the heavy duty with which it is clogged, and in spite of an unfavourable year, has made such progress, what development would it not assume when the duty is not more than half what it now is. M. Leon Say estimated that the increase would not be less than 20 per cent. on the first year. There is assuredly no exaggeration in this estimate, which would be exceeded, eventually, by the use of sugar in the making of wines, and for other agricultural and industrial purposes, for which it is suited. But for that, it is necessary that the rate of the new impost should be very low, and upon this point we wholly agree in opinion with the Extra-Parliamentary Commission which decided, as we know, on a duty of 30 francs, which will be singularly helpful in reassuming the work indispensable to legislation.

These ideas will throw light on the discussion of the Customs tariff and arguments will not be wanting to reconcile differences. The exports of Austria and Germany have never been more considerable. Never has the industrial and agricultural progress realised by those two countries, under the shield of an intelligent legislation, more than of protection, been so menacing to the future of our industry.

The temperature of the week, foggy and variable, shows the singular persistence of cold; the thermometer is again down to 10 degrees below zero, without rising 3 degrees above that figure. Ice still locks up the rivers and canals, and intercommunication is in consequence impeded. But this weather but slightly interferes with our *fabricants*, whose work, with some exceptions, is everywhere finished. We may, therefore, consider the active period of the season of 1879-80 as near its end. It will have been very short, if we consider the late period at which the working commenced, a campaign of two months, the production of which, insufficient to the rural labour which it largely supports, will scarcely provide for our internal requirements.

A full harvest would have permitted us to export 150,000 tons of sugar, and to receive in payment 100 millions of francs, of which the agriculture of the sugar regions will be cruelly deprived this year. The insufficiency of the crop has not permitted us to turn out, to December 31st, more than 8,000 tons against 93,000 tons in 1878. These figures eloquently exhibit the influence of beet cultivation on the public wealth. The demonstration will be complete when we add that not only Austrian and German sugars have taken our place in foreign markets, but that entire trains have been imported, with a view to refining for export, which our indigenous production has failed this year to provide for. There is, therefore, a great inducement to augment our cultivation of the beet, and, thereby, to moderate such recurring deficits as we are liable to suffer from.

In the other parts of Europe the manufacture equally approaches its end, and nothing has occurred to modify previous estimates of a general production, less by about 200,000 than that of the last season.

POST OFFICE REFORMS.

A change is taking place in our postal system—one that will attract the attention of millions of our fellow-countrymen, and mark an era for the possessors of postage stamp albums; the change will make our old acquaintance, the penny postage stamp, a creature of the past.

The Postmaster General has issued his decree. It runs as follows:—"A Penny Postage Stamp of a new design will shortly be issued. It is similar in its general features to the present stamp; the colour, however, is of a paler red. As the stamp is printed on thinner paper than that hitherto used, and as the gum is of a better kind, it will adhere more readily and securely to the letters." By the way, the term "postage labels," which the department has so long vainly endeavoured to force into adoption, seems at last to have been discarded, except in the margins of the sheets of stamps.

On the 10th of January, no less a period than forty years elapsed since the penny postage system was adopted; and since that date one improvement after another has been introduced, to the manifest convenience and benefit of the entire nation. The administration of so extensive a department,—the working of such a mighty and complex machine as the British Post Office, is so onerous that it is not to be wondered at if every reform does not proceed from within; the marvel is that so many of the improvements do originate from the Postmaster General and his staff.

It is always more easy to suggest changes than to make improvements; and it is easy for outsiders to over-estimate the importance of their proposals and to under-estimate the practical difficulties in the way of their adoption.

It may be well, however, to consider the new penny, and other postage stamps, and also whether certain other minor reforms are not ripe for adoption.

POSTAGE STAMPS.

Those who remember the large stamps first issued will call to mind the grim aspect of the queen's effigy upon them. The sub-

stitution of the smaller stamp was a distinct improvement, and the more recent introduction of the perforations was universally hailed as a boon. But the penny stamp has been a poor affair, utterly unworthy of the country which first adopted a cheap uniform rate of postage. The paper is so rotten that the stamps often become torn on separation, and the flavour of the gum is disliked by every single individual among such of the thirty-four millions of our fellow-countrymen as have tasted it. This, it is true, has been counteracted at times by reducing the quantity of the gummy material, so that after the tongue of the user has unwillingly removed a portion, nothing is left to promote adhesion to the letter. The gum *should* be tasteless, but if a flavour *must* be given, almond, lemon, or vanilla would be preferable to the nauseous compound hitherto supplied. This gum (so called) is either so compounded or so applied as to cause the stamps (especially when they become dry) to curl up in the most obstinate manner. If the Government would sell the recipe to the great Rowland, they might realize a considerable sum of money, for the addition of a little of this substance to the celebrated Macassar Oil would ensure an intense and permanent curl to the hair that would greatly enhance the already extraordinary reputation of the unguent.

The propensity of the gum to quit the reverse side of the stamp is no more marked than that of the colouring matter to leave the other surface. A pleasing experiment may be made as follows:— After affixing a stamp to a letter, press the finger or fleshy base of the thumb upon the stamp, and a counterpart of the Queen's head will be distinctly visible on the skin. With a little dexterous manipulation this may be again imprinted upon a piece of writing paper.

In the centre of each penny stamp the figure of a crown appears as a watermark. This is ingeniously arranged so as to impart a blotchy appearance to the face of the Queen.

That it is possible to produce a penny stamp on paper that is not both thick and rotten, that is not backed by a nauseous variety of size, that will not curl upon the least provocation, that does not deface the Queen's portrait with the watermark, nor soil it and your finger,

with the dye, is evident from the fact that another departments that of the Inland Revenue, has long provided a penny receipt stamp that possesses none of these great defects.

The halfpenny postage stamp is however so much worse than the penny stamp, that the latter seems tolerable by comparison. The paper is even more rotten, and the chance of tearing a stamp from its neighbours along the line of holes is even more remote. The persons employed in the perforating department deserve commendation for the ingenuity they display. They frequently succeed in running the punctures across the stamps, instead of following the margins. This, however, is of little consequence, it simply exhibits a degree of slovenliness that would not be tolerated in France or any other neighbouring country. Not content with this, they have entirely omitted the perforations along one edge of the sheet, which necessitates the use of scissors or knife when the last stamp of each row is used; and in order to make amends for this lack of holes (perhaps they are paid by the number of perforations,) they have contrived to punch holes in the opposite margin so as to produce a series of little rectangular spaces precisely the size of stamps, and not distinguishable therefrom when the gummed surface is uppermost. Though this device must be troublesome and expensive to carry out, its effect is not lost, for the annoyance of the purchaser, who has counted on a stamp which he finds he does not possess, is considerable. The halfpenny stamp is no favourite. It is about two-thirds the size of the penny stamp, and although the area at disposal is so much reduced, the Queen's head is made to occupy a small circle, surrounded by abundance of margin, and the general effect is remarkably poor.

Exclusive of newspaper wrappers, post cards, embossed postage envelopes, and registered letter envelopes, the number of postage stamps proper is legion. The varieties are—½d., 1d., 1½d., 2d., 2½d., 3d., 4d., 6d., 8d., 1s., 2s., and 5s. Yet a considerable number of these are so rarely used that postmasters are not required to keep them in stock. The stamps most in request are ½d., 1d., 2½d. (foreign stamp), and 3d. (registration fee and postage).

The colours are arranged in no sort of natural order. The ½d.,

1d., 1½d., 2½d., 3d., and 5s. stamps are various tints of red. The 2d. and 2s. stamps are tints of blue, the 4d. is olive, the 6d. grey, the 8d. cinnamon, and the 1s. green. The panel surrounding the Queen's head is variously arranged; the triangle on the three-halfpenny stamps and the hexagon on the sixpenny stamps bear some natural relation to their values. Some such remodelling of the stamps as the following might be adopted. Each stamp, except the 2½d. one, should be punched with minute holes across its middle, so that when rent across, each part would pass for half the value of the whole stamp. The denominations and colours would then stand—

1d.—Red.

2½d.—Orange.

3d.—Yellow.

4d.—Green.

1s.—Blue.

5s.—Violet.

And by subdivision they would also give ½d., 1½d., 2d., 6d., and 2s. 6d.

The colours would be ranged in their natural order of refrangibility.

The margin or border of the stamps would be occupied thus—In the upper and lower margins the word **POSTAGE** would be boldly printed in Egyptian character, and the lateral margins would be occupied by the value of the stamps whether **ONE PENNY, FOURPENCE, or FIVE SHILLINGS**, similarly displayed. On one side the words would run from the lower to the upper end, and on the other side from the upper to the lower end, so that the value of the stamp would admit of no doubt even when it had been divided across the centre. The lettering should be *extremely bold* and clear, for the display of the value of the stamp is the main object to be obtained.

The whole of the interior of the stamp should be covered with the rates of postage, which, if carefully managed, would at a distance present an almost flat background. Over this, the value of the stamp in clear bold figures should occupy the chief portion

of the field. This should be enclosed in a figure bounded by as many sides as the value of the stamp represents pence. The penny stamp would contain a circle; the 2½d. stamp a figure resembling a bishop's mitre with two long arcs of circles and one straight line of half their length. The figures would be surrounded by a dodecagon in the one shilling stamp, and by five such ranged concentrically in the case of the five shilling stamp. The two shilling stamp might be larger than the stamps of inferior value, and the five shilling stamp be somewhat larger still.

The number of stamps in use would thus be reduced, to the comfort of postmasters, and the much greater comfort of the public; the halfpenny stamp, as such, would be abolished, yet no one who possessed a penny stamp would be at a loss for this useful but often absent "label."

The value of a stamp could be seen at a glance, and that puzzling table of rates of postage could be readily referred to when wanted. The most ignorant could distinguish the value of the stamps.

The device of emblazoning the Queen's head, upon stamps, the figure of her so much beloved by her subjects, was not a happy one. To say nothing of the process of moistening them, almost universally adopted, the method of effacing, blotching, and in reality *de-facing* the Queen's likeness by her own servants is indefensible on æsthetic principles.

Moreover, the effigy as it appears on the penny stamp, worn and indistinct, without sharpness of outline, the eye partially effaced, and the cheek blotched by the water mark is far from creditable. Furthermore, in the youthful features pourtrayed, her subjects do not recognize the features of her they know and love as our present Queen. The earlier portraits of persons we have known in later years are always unsatisfactory. How insipid and devoid of character are the youthful likenesses of Palmerston, Wellington, and Earl Russell. Recent photographs of the Queen are greedily purchased, former ones are simply unsaleable. A gain to art would be secured by placing the image of the Queen only in appropriate positions, and by removing it from that most

inappropriate one, the postage stamp ; every example of which is doomed to be bleared, and blotched, and daubed. No lover ever defaced the likeness of his mistress. No devotee ever defiled the resemblance of the features of the Saint he reverenced, yet the miserable device of pourtraying the countenance of our Queen for the express purpose of defacing it continues in England until this day. Other nations have seen the absurdity of this practice ; we are all familiar with some of the French stamps which display in their centre the number of centimes they represent in value ; and even the Dutch, who are not usually supposed to be the earliest to make reforms, have removed from some or all of their stamps the likeness of their King, and have replaced it by a figure denoting their money value. No representation of the Emperor is found on the German stamp.

The corners of our stamps may surely be better occupied than by the letters which define their position in the sheet as though they were graves in a cemetery. The Dutch repeat the value of the stamp in the corners, but the better course would be to permit the lettering in the sides or end to extend to the corners which would allow a bolder type to be used.

THE POST OFFICE GUIDE.

The improvements recently introduced in this publication are numerous, and they have been fully dwelt on in the newspapers. As complaint has been made of the paper of which the penny and halfpenny stamps are made, it may be here remarked that the paper used in the official guide is excellent. It is thin and yet strong, and the leaves can be readily turned over.

The postal authorities do not think it unbecoming to load their official guide with advertisements. If they desire to receive a good round sum of money and that without their needing to purchase paper on which to print advertisements, let them cover the *backs* of the stamps with advertisements. The revenue from this source would be considerable. The proprietors of the "J pen," the "Ozokerit candle," or the "Specialité sherry," would pay handsomely for this coign of vantage.

LETTER BOXES.

Receiving boxes, whether in pillar posts or at branch offices in London and other centres of dense population, should be cleared not two or three times a day, but as many times every hour, so that the letters will be sped to their several destinations with the least delay.

If pillar posts were flattened, instead of being cylindrical, that is to say, if they were oval in horizontal section, they would be as capacious as at present, and would offer less obstruction to traffic in crowded thoroughfares.

POST CARDS.

The cheaper variety is a failure. The cards are too soft for convenience of writing, and so thin that they become easily doubled, and they are not unfrequently found slipped into letters. Occasionally two cards adhere together, and the address is written on one card and the message is inscribed on the other. Thus the person addressed obtains a card without a message, and the letter-carrier, as Lord Dundreary would tell us, is perplexed in the endeavour to find out "a fellow that hasn't got any name."

The price of the cards is such that a purchaser of a smaller number than six is required to pay an increased price, and thus the poorest persons who make use of the Post Office pay the most for the benefit they obtain.

The "stout" cards are pleasant to write upon, and there is no ground of complaint from their being too thin. Indeed they are if anything too thick and good. Each "stout" card weighs nearly as much as three thin ones. The foreign post cards are about eighteen per cent. larger than the British ones.

The cards are all made up in packets of twelve, so arranged that one or more may be abstracted without being detected, unless the purchaser counts the number remaining in the packet.

It is suggested that:—

1. The issue of thin post cards be discontinued.
2. The stout card be increased in size to that of the foreign post card.
3. That it be reduced slightly in weight and, if a tinted card,

such as is used in France would be cheaper than the present Bristol board, that such be employed. A distinctive tint should be selected.

4. That the price remain as at present, 8d. per dozen, but that they be made up in shilling packets of 18 cards with a slip of paper pasted round in both directions so that cards cannot be abstracted.

5. That the cards be placed together in pairs, face to face, so that the inconvenience of addressing one card and writing the communication on the next card be impossible.

POSTAGE ENVELOPES

Are so excellent in every way that no suggestion for improvement can easily be made. The embossed stamp is a work of art, it is extremely beautiful, and the only error is in so misplacing the effigy of our Sovereign. The paper is good in quality, smooth and opaque, and as 24 envelopes are sold for twopence, they are very cheap. The avoidance of the stamp-moistening process is a great gain. The rule forbidding an unused embossed stamp cut from a spoiled envelope to be used on another envelope is antiquated and absurd. If the Postmaster-General would add to the present series of stamped envelopes one of smooth strong brown paper of a larger size (say to hold foolscap sheets folded transversely), and impressed with a three-halfpenny stamp, he would supply a real want. How frequently a person who is amply supplied with small envelopes requires a larger one, and finds difficulty in procuring it.

REGISTRATION ENVELOPES

Are excellent.

RATES OF INLAND POSTAGE.

Most persons find a difficulty in remembering these. There is a principle underlying the scale, and when this is appreciated the rates of postage are easily remembered.

1. The facilities for very cheap postage (for anything save printed matter) end with three-quarters of a pound, in order to protect the interests of railway companies and other common carriers. Therefore, all letters exceeding this weight are charged one penny per ounce.

2. One penny is the normal price charged for a letter, but it must not exceed one ounce in weight. All excess *is charged at book-post rate*, and may be reckoned in the following manner. The rate for book-post is $\frac{1}{2}$ d. for 2 oz. The book-post rate is then simply added to the normal letter rate. For example : if a letter weigh 7 oz., one penny is charged *because it is a letter*, and the book-post rate is added, namely, one penny, and four halfpence (*because it is under 8 oz.*) ; total, 3d.

If a letter weigh $1\frac{1}{2}$ oz., the charge is 1d. because it is a letter, and $\frac{1}{2}$ d. because it is under 2 oz. book-post rate ; total, $1\frac{1}{2}$ d.

Attention to this principle is desirable, because its application to telegrams is much to be desired.

TELEGRAPH DEPARTMENT.

Improvements in telegraphy have enabled a very much larger amount of work to be passed over each wire than formerly. Rowland Hill found that the cost of the transport of a letter from office to office was small, and very little more for long distances than for shorter, and this circumstance is still more apparent in the case of a telegram. An important element in the cost of a telegram consists in the need of a special messenger who may be required to traverse two miles (out and home) with any message. Another source of expense is the time lost in calling the operator at the receiving instrument ; and a further charge, not less important is the need of sending the address (often a long one) free of charge. Even if the substance of a telegram consist only of a single word the cost to the department is *almost* as great as if it were a long message. A paper form is required at each end, an envelope must be furnished, a copy of the message must be retained at the office, a messenger must be procured and despatched, and all the machinery of the department is as much brought into play as if a long message were sent.

The policy of the department should be to endeavour when all this expense had of necessity to be encountered, to induce the sender to despatch as long a message as possible.

Yet the present charge for all above 20 words is excessive, and almost prohibitive. Suppose the two addresses were compressed

into ten words, a shilling message would carry thirty words in all. A second thirty words would be conveyed much more cheaply to the office, the apparatus being all at work, the two operators *en rapport*, and no further charge for messenger incurred. Yet, the office charges 1s. 6d. for this second thirty words or 50 per cent. more. It would be better policy to charge only 6d. It is then suggested that the principle of letter postage be applied to the telegrams. Say 1s. for the message not exceeding 20 words and address, and all in excess at one farthing a word (but no sum less than a halfpenny would be taken.) The effect of this would be to enlarge telegrams to the size of letters, and persons would not condense their messages into twenty words, but would send just what they desired. The office would probably not lose any thing, the public would be very substantial gainers. Such an arrangement would be of great service to newspapers, but surely this is merely another way of saying to the *readers* of newspapers, who are the entire intelligent portion of the community. This is a feature in the suggestion only second in importance to the gain to the commercial and other ordinary users of the telegraph service.

Telegraphic forms are supplied gratuitously, yet purchasers of a book containing twenty stamped forms are charged twopence in addition to the value of the stamps. This is a needless charge. The object of the office should be to induce its customers to purchase them. First, because those who carry stamped forms very freely use them; second, the office is a gainer if it can induce them to invest money in stamps instead of keeping it in their pockets; third, though the forms supplied gratis are not stitched, they are secured by a metal eyelet which is as useful as the binding, and the plain sheets interleaved and bit of carbonised paper are of trifling value. It would be a better policy to sell twenty stamped forms for 19s. 10d. than for 20s. 2d.; however, 20s. would be a fair price.

Much greater use might be made of the telegraphs, if their scope were extended to another class, viz., those who are not prepared to pay one shilling for the *instant* conveyance of a message by a special messenger, but who desired not to wait the comparatively slow transmission of a letter.

This could be met by the introduction of a new form of telegram, the "MAIL TELEGRAM" as opposed to the "EXPRESS TELEGRAM." It would be a hybrid between a letter and a telegram. The sender would hand in his telegram or drop it into a letter box and it would be transmitted at once to the *postmaster* at the place of destination. It would then be delivered to the addressee by the next ordinary delivery. This would abolish the special messenger and enable the department to transact a large amount of such business at a trifling expense. For this service a charge might be made of 6d. for the telegraph and ½d. for the postal delivery, though probably 5½d. for the first service and ¼d. for the latter would be sufficient. Additional words would be charged a farthing each. A person at Glasgow might by this system communicate with his friend in London, and receive a reply at his place of business in Glasgow in the course of a forenoon. A person in Jersey, Cork, or Aberdeen, could practically send a respectable letter to his London agent for 1s. or 1s. 6d., and the time lost in transmission would be reduced from days to hours.

The regulation which prevents the postage stamp from being used for telegraphic purposes, and *vice versa*, is an arrangement of the circumlocution office, and must be abolished ere long. There certainly can be no difficulty in the Telegraph Department keeping a record of the income derived from the messages which they despatch, without this absurd complication of stamps. The rule requiring the sender to affix the stamp should be rescinded.

A more serious difficulty, which, however, should be grappled with and surmounted, will be to make such an arrangement between the Inland Revenue and Post Office Departments as will permit one variety of stamps to be used for both purposes. The annoyance experienced by many persons for want of receipt stamps, which so often results in the neglect to affix a stamp at all, will be no longer felt. The accounts of the Inland Revenue may be not so easy to keep; but the convenience of the public should be the first care of the Government, and the statistician must make other arrangements, or leave us in ignorance of the precise sums used for each purpose. Each stamp should represent tribute money, and be employed, according to its value, for all the foregoing purposes.

The postal system though already a marvel of success is only in its infancy and many improvements will be made. They are inevitable. Let it be the care of the country of Sir Rowland Hill, to lead in the van, and not be dragged in the rear.*

FUTURE REFORMS.

Various anomalies in the rates of postage still exist. A letter to Persia, *via* Vienna, costs $2\frac{1}{2}$ d., whilst another to Bombay (a British possession), by the cheapest route, costs 4d. A letter is carried to Tahiti, *via* San Francisco, for $2\frac{1}{2}$ d., whilst the charge to Barbados (a British colony, and only two weeks distant) is 4d.

The condition of the Public Chest will not permit the Chancellor of the Exchequer to dispense with any present source of income. But this state of affairs will not be permanent, and brighter times will restore the old condition of elasticity to the revenue, and the pleasing duty of the Chancellor of the Exchequer will be to search for the best points for making remissions of taxation. When that time shall arrive, the claims of the Post Office must be examined. The Post Office may be considered in the light of a co-operative society of such of the nation as require to transmit letters or telegrams. All the profits derived from the enterprise should be returned to the members or persons using the office. Yet our present method is to confiscate the profit on the working of the department, and expend it for building ships, employing soldiers, or paying interest on the national debt. This is no other than laying an enormous tax upon each letter, and it is a "tax upon knowledge" of the most pernicious character. It falls very inequitably. The middle or trading class make use of the post-office much more freely in proportion to their incomes than the wealthy classes above them. Further, it is a direct tax upon trade and commerce.

How then can the post-office surplus be best employed in favour of the class who have provided it. It obviously cannot be wisely employed in reducing the nominal rate from one penny to three farthings, or in departing from the principle of the system by reducing the rate for short distances. A splendid reform lies in the future. It is in the extension of the area over which the rates of Inland postage are payable—from the United Kingdom to

the whole British Empire. A penny stamp would then frank a letter to Madras, Melbourne, Manitoba, Malta, or Montserrat. The effect of such a change in promoting intercourse among the various parts of our widely scattered empire, and in drawing the stream of emigration towards our colonies instead of to other fields, cannot be easily estimated. Such an arrangement would develope trade, and would be no inconsiderable element in the compacting and welding together of the integral parts of the British Empire, which all enlightened statesmen see is one of the most important tasks which lies in the near future.

When the time for this reform shall arrive, the stamps will bear on their upper and lower edges the proud words **BRITISH EMPIRE.**

The post-cards should *eventually* be sold for one halfpenny each. The humblest person can then make use of the Post-office upon the most favourable terms, although such should only purchase a single post card, and the practice adopted by the Postal Union of not making a charge for the material of the post-card will be followed. Whoever the Premier may be who shall introduce a reform that will permit a written communication to traverse the whole British Empire for the smallest coin in ordinary use, will be gratefully remembered by his fellow-subjects of to-day, and will help to consolidate and keep intact the British Empire for ages to come.

ALFRED FRYER.

Elm Hirst, Wilmslow, near Manchester.

A PROPOSED TARIFF ON SUGAR FOR THE UNITED STATES.

We take the following from the opening number of the "*America: a Weekly Journal of Modern Progress,*" first published in New York on the 15th ultimo :—

"It is said that at the next session of Congress there will be a general and thorough revision of the tariff.

"This is no doubt very desirable, and in the case of many

articles imperatively necessary, notably so in the matter of sugar duties, which constitute the largest item in our list of imports. For nearly sixty years prior to 1846 there were but two classes of sugar recognized in the tariff law, viz., raw and refined. From 1846 to 1861 the tariff was *ad valorem*. In 1861 the specific duty was resumed and the Dutch standard of colour employed to distinguish between the different grades, which were only three, representing, *first*, sugars fit only for refining; *second*, raw sugar fit for consumption, called grocery sugars; and *third*, refined sugars. In 1862 the grocery sugars were divided into two grades, making four in all, and, thus amended, the tariff remained until 1870. In 1870 the present tariff was adopted, by which the first grade in the old tariff, viz., refining sugars, was subdivided into three classes besides melado, and still another division of grocery sugars was established. This system, which was born in a conference committee after the twice repeated vote of the House of Representatives against the subdivision of the refining sugars, was soon found to work unfairly and unsatisfactorily. The basis established proved to be an unnatural and incorrect one, inasmuch as many of the lighter coloured sugars, which were taxed from one-quarter to one-half cent. per pound more, were intrinsically of no more value for refining purposes than the darker ones, and by reason of the discrimination in the duty, the brighter sugars were being driven out of the market. This condition of things was greatly aggravated by the imposition in 1875 of an additional duty of twenty-five per cent. on the rates then existing, which had the effect to still further increase the discrimination against the better sugars and almost completely prohibit their importation. Not only so, but the importing merchants discovered that the subdivision among refining sugars opened a wide door for dishonest practices, by collusion between unscrupulous persons in the trade and the Government samplers, a class of poorly-paid officials who practically determine the duties, and who, with very little danger of detection, were able to misrepresent the true character of the cargo, by means of which not only was the Government defrauded of large sums, but the business of honest and legitimate importers was being destroyed.

"Investigation on this point by the Government confirmed the suspicions of the trade generally, and these among other reasons caused widespread dissatisfaction and a universal desire for a change.

"Another serious difficulty has grown out of the same arbitrary and unnatural distinction among refining sugars. Many of the foreign producers of sugar, finding themselves shut out of the United States market by reason of this discriminating tariff, set themselves to see if they could not conform their product to the demands of the tariff as to colour, and at the same time retain those other qualities which made them desirable for refining purposes. In this they were partially successful, and the result was that in 1878 nearly ninety-five per cent. of all the sugars imported were of the two lower grades of refining, and only one-half of one per cent. of sugars fit for consumption. This result attracted the attention of the Treasury Department, which, with its usual direct methods of reasoning, accounted for the change on this wise, to wit: 'Whereas, these sugars were once light and are now dark, it is evident they must be artificially coloured to evade the duty.' The cry of 'fraud' was raised against the sugar importers and through the length and breadth of the land were heralded the names of respectable and honourable merchants as being guilty of the grossest dishonesty. Acting on the false assumption of the artificial and illegal colouring of sugars, the Secretary of the Treasury has, by proclamation in the form of Treasury orders, established a new basis of sugar duties unknown to the law, viz., the percentage of crystallizable sugar to be ascertained by the process of polarization. This action of the Department is universally condemned as illegal and utterly without justification, and all duties so assessed have been paid by the merchants under protest, with every confidence of recovering all such exactions; and all classes of importers and refiners will rightfully demand of Congress the prompt adjustment of the sugar tariff, whatever may be done concerning general tariff revision.

"Various plans have been suggested for a new tariff. Some have proposed a return to the *ad valorem* system, but the history

of its workings when in vogue, and the present tribulations of the silk, velvet, kid glove, and other classes of importers under the *ad valorem* system, demonstrate beyond question that, applied to sugar, it could never be made to work satisfactorily to either the Government or the merchants.

"Another plan which was urged with great pertinacity in the last Congress is the application of the polariscope; but when it is known that the opportunities to defraud the Government through improper sampling are, under this system, absolutely greatly increased, that the utmost scientific nicety is required in its use, and then, under the most favourable circumstances, important differences in tests are found, which will inevitably lead to continual and serious disagreement between the importer and Custom House official, and further, that it would be impossible under such a tariff, for the merchant, in making his purchases, to know with any degree of certainty what his duties will be,—this proposition will find no favour with thoughtful men who would guard the revenue and protect the commerce of the country. In order to secure these two great objects, which should be fundamental in all tariff legislation, we must have a tariff at once simple and economical, and which gives the greatest possible protection to both parties in interest.

"There still remain the three *natural* divisions into which sugar is classified. The *first*, sugars fit only for refining purposes, say not above No. 13, by the Dutch standard of colour; *second*, what are known as grocery sugars, that is, raw sugars, fit for consumption; and *third*, refined or white sugars. These are the only natural and easily-defined classes, and the only ones that should be recognized in framing a tariff. A single rate of duty on all sugars fit only for refining; a slightly advanced rate on raw sugars fit for consumption, which, while fairly protecting our own sugar manufacturers, will not be prohibitory; and a still higher rate, which will protect our refiners against those of Europe, comprise all that is requisite and all that is practicable in any sugar tariff. Such a tariff would be simple and economical in administration, dispensing with the small army of chemists and spies requisite in any graded tariff, and

would insure the prompt and honest collection of the revenue, and relieve the merchant from the embarrassments growing out of the much graded system, enabling him to purchase his sugar in any part of the world with positive knowledge of the duty to be paid on their landing, by which he will be able accurately to compute their cost.

"Let the Forty-sixth Congress enact such a sugar tariff, as promptly as possible, and a new impetus will be given to this branch of our commerce, by which it will be rapidly and widely extended, to the benefit alike of the Government and all its subjects, including importers, refiners, and consumers."

The above paper was in type, and intended for our last number, but excluded for want of space. Since then we have received the following memorial on the same subject:—

The following is the full text of the memorial presented to Congress on the subject of the sugar duties, and referred to the Committee of Ways and Means of the House of Representatives. The signatures attached thereto, we need scarcely say, are those of the leading sugar houses in this country, and entitle it to the most careful and earnest consideration. Whether other changes are made in the tariff at the present session of Congress, it is felt by the sugar trade that this article at least must receive attention:—

MEMORIAL.

To the Honourable Senate and House of Representatives of the United States in Congress assembled:

The undersigned, importers, refiners, and dealers in sugar, do most respectfully represent to your Honourable Bodies:

First. That the entire business of the importing, refining, and distributing of sugar in this country, involving about one hundred and fifty millions of dollars annually, has been for the past three years, and is now, by reason of the present tariff and the constant agitation of a change of the same, seriously deranged and embarrassed.

Second. That disregarding the law which prescribes the Dutch standard of colour as the sole basis of dutiable value, the officials of the Treasury Department in some of the ports are arbitrarily fixing rates of duty on another and totally different basis, thereby endangering all business transactions in foreign sugars, and already involving large amounts which have been paid by the importers under protest.

Third. That the before-mentioned condition of business, together with the declarations of the Secretary of the Treasury, of great losses to the revenue, demands a revision of the sugar tariff by Congress, at the earliest practicable moment, for which your petitioners do most earnestly pray.

Fourth. Your petitioners also desire most respectfully, but emphatically, to protest against the measure introduced into the last Congress, in which it was proposed that the Treasury Department should attempt by some means to establish the percentage of crystallizable sugar as a basis of duties, inasmuch as such a measure is impracticable and unsafe for the Government; leading inevitably to serious controversies between merchants and the Treasury, while it also puts into the hands of subordinate officials increased facilities for that favouritism and unfair discrimination which is a principal cause of complaint against the present graduated tariff.

Fifth. Your petitioners most respectfully urge, upon your Honourable Bodies, consideration of the report of the Judiciary Committee of the House of Representatives in 1875 on tariff laws, wherein they say:—

“We believe that importing merchants, who pay into the Treasury so large a part of the money which constitutes the pecuniary resources of the nation, are entitled to be clearly and distinctly told what rates of duty will be exacted from them, that no undue disturbance of their business transactions should be made by unexpected Treasury exactions.”

Sixth. We heartily agree with the recommendation of the Secretary of the Treasury in his annual reports of 1877 and 1878, which is entirely in harmony with the above report of the Judiciary Committee, and in which we believe he points out the only practical,

sensible, and safe remedy for the difficulties complained of, insuring to the Government the honest collection of the revenue, and to the merchants and others engaged in commerce in this great staple, a safe basis for business transactions.

The Secretary's report of 1878 is as follows: "It is imperative that some change in the mode of collecting duties on sugar should be made, and it is preferred, as stated in the last report, that the duty should be at one rate on all grades of sugar up to a point which will exclude temptation, either to colour sugar for the purpose of reducing the duty, or to commit fraud by means of sampling and classification. The duties now are, to a large extent, dependent upon the fidelity of the sampler, one of the lowest paid officers in the public service."

SUGAR REFINERS.

C. W. Durant & Son, New York; Havemeyer Bros., & Co., New York; Havemeyers, Eastwick, & Co., New York; Dick & Meyer, New York; Corner Bros. & Co., Pacific Sugar Refining Co., New York; North River Sugar Refining Co., New York; Globe Sugar Refining Co., New York; Moller, Sierck & Co., New York; Booth & Edgar Sugar Refining Co., New York; McKean, Newhall & Borie, Philadelphia; Forest City Refining Company, Portland, Me.; Belcher Sugar Refining Co., St. Louis, Mo.

SUGAR IMPORTERS.

Maitland, Phelps & Co., New York; Grinnell, Minturn & Co., New York; Lanman & Kemp, New York; Leaycraft & Co., New York; Hewlett & Torrance, New York; Fernandez & Calvo, New York; Voges & Co., New York; Jules Sazarac & Co., New York; J. & G. Fowler, New York; Daniel Trowbridge, New Haven, Conn.; J. M. Ceballos & Co., New York; Rubira & Co., New York; Renauld, Francois & Co., New York; Galwey & Casado, New York; C. Marti & Co., New York; M. Echeverria & Co., New York; A. H. Mojarietta & Co., New York; Cazade, Crooks & Reynaud, New York; Waydell & Co., New York; Gustavus Coombs, New York; S. & W. Welch, Philadelphia and New York; L. W. & P. Armstrong, New Haven, Conn.; J. De Rivera & Co., New York; Reynes Brothers, New York; E. Paven-

stedt & Co., New York; Dwight & Platt, New York; Louis Monjo, Jun., & Co., New York; James M. Aviles, New York; Thomas J. Owen & Son, New York; Fabri & Chauncey, New York; Recknagel & Co., New York; A. A. Low & Bro., New York; P. Harmony's Nephew & Co., New York; Bowring & Archibald, New York; Odio & Perozo, New York; Jones & Lough, New York; R. P. Buck & Co., New York; Thebaud, Bros., New York; Henry Beste, New York; S. Michelena, New York; Knowlton & Co., New York; Brugiere & Co., New York; Youngs & Co., New York; H. P. Finlay, New York; R. A. Tucker & Co., New York; Fred. Lyman & Co., New York; Fred. Springs & Co., New York; Ricardo Acosta, New York; C. A. Sherman, New York; Brooks & Co., New York; F. Latasa, New York; William Jex & Co., New York; Howland & Aspinwall, New York; Roche Bros. & Co., New York; Donald Cameron & Co., New York; D. De Castro & Co., New York; Williams & Guion, New York; A. E. Outerbridge & Co., New York; R. B. Borland, New York; Asencio Losado & Co., New York; Pim, Torwood & Co., New York.

The Committee on Ways and Means have decided to take up the consideration of the question of readjusting the duties on sugar on January 27, and on that day will give the refiners and importers a hearing, continuing the hearing from day to day for about a week. The Committee first decided, in the absence of Mr. Gibson, of Louisiana, to begin the hearing on January 13, but upon the appearance of that gentleman he objected to that date for the reason that he would be detained at New Orleans until after the 13th. The gentlemen interested in a speedy settlement of the important question justly complain of this protracted delay to accommodate the personal convenience of one member of the Committee on Ways and Means. Last year the sugar importers paid \$42,000,000 into the Treasury for duties, and since July last all duties paid on sugar have been paid under protest, because of the regulation then established by the Secretary of the Treasury requiring the rate of duty to be determined by the polariscope. All the persons directly interested are anxious to have this question determined at the earliest practicable day.

CEYLON COFFEE SOILS AND MANURES: A REPORT OF
THE CEYLON COFFEE PLANTERS ASSOCIATION.

By JOHN HUGHES, F.C.S., London, 1879.

This is an interesting little work in which Mr. Hughes describes his journey to Ceylon, his tour up the country, and gives an account of his examination of the coffee soils and various manures employed in that island. Besides these details the work contains a good deal of practical information upon agricultural chemistry in general. The author is evidently a painstaking analytical chemist who has done his best to ensure accuracy in his results, and gives his opinion upon the present state of coffee culture and the means which he imagines may improve its prospects.

The numerous analyses of the Ceylon soils given in this work confirm certain results already obtained by Dr. Phipson (and made known in the pages of this magazine), who first pointed out the baneful effects of an excess of magnesia in the cane soils of the West Indies. All these Ceylon soils show an excess of magnesia over the quantity of lime, and though Mr. Hughes does not appear to be struck by this fact, he says:—

"The falling off in the annual production cannot, I think, be entirely due to the ravages of leaf disease. A succession of unfavourable seasons, the premature dying away of coffee trees planted *on land naturally unsuitable*, and the indiscriminate felling of jungle on exposed ridges, have doubtless very materially contributed to the falling off in the production."

In reply to the question : What are the most suitable manures for coffee? which has been so often asked, the author very wisely abstains from giving any decided opinion.

He tells us (p. 121) that "it is scarcely possible to lay down any general rule on this important subject."

It is evident, in fact, to any impartial reader of these pages that no *special* manure for coffee has yet been discovered, nor is likely to be discovered, until the planters of Ceylon have taken the matter vigorously in hand experimentally, as some of the larger owners of cane plantations have done in the West Indies.

On page 150 we find the following curious assertion : "The presence of manganese even in small quantities, as 0·4 to 0·6 per cent. is rather a sign of natural fertility in a soil. In the sugar soils of Queensland it exists to such an extent that a distinct colour is imparted to the sugar produced in certain localities." Now, in the first place, though manganese has been found in many vegetables, for instance, in the ash of beech and other trees, it has yet to be proved that it has any effect whatever upon the fertility of a soil ; and as for its being the cause of the colour of sugar produced in certain localities, it is, to say the least, a very hazardous assertion on the part of an analytical chemist.

Again, on p. 79, when endeavouring to account for the dying out of coffee trees on certain soils which he has analysed, Mr. Hughes attributes this phenomenon to a deficiency of potash in the soil ! On turning to the analysis, we find : "Moisture 1·9 per cent." Less than 2 per cent. of moisture, we imagine, is quite sufficient to account for any amount of "dying out," without troubling our heads about potash.

On the whole, the report is well worth reading ; it represents a large amount of difficult work done in the laboratory, and will prove serviceable to all interested in coffee planting.

We learn from the *Queenslander*, of November 8, that "the total quantity of sugar received into the Mackay stores during the present season, up to the end of October, amounted to 4,632 tons."

A great flood is reported to have swept over the island of St. Kitts, causing a loss of 200 lives and the destruction of property to the value of \$250,000.

The Madrid Society for the Abolition of Slavery has addressed a petition to the Congress of Deputies, praying that all slaves in the Spanish possession may be set at liberty at once, and simultaneously the journalists of Valadolid have given a fête in honour of the French Consul, in token of their gratitude for the generosity displayed by Frenchmen in assisting the sufferers by the floods.

COMMERCIAL AND OTHER STATISTICS OF THE UNITED KINGDOM.

Year.	FOREIGN WOOL		COTTON.		RAW SILK.		TOTAL VALUE OF IMPORTATIONS.	
	Lbs.	Per Head.	Lbs.	Per Head.	Lbs.	Per Head.	£	Per Head.
1853	107,671,080	3·89	746,709,069	27·00	6,046,852	0·22		
1854	81,612,732	2·94	764,007,037	27·49	6,439,104	0·23		
1855	69,846,980	2·50	767,383,792	27·51	4,448,307	0·16		
1856	89,531,599	3·18	877,225,440	31·10	5,945,074	0·21	172,544,154	123/2
1857	93,262,679	3·29	837,391,296	29·53	10,371,306	0·37	187,844,441	133/5
1858	100,037,181	3·50	884,732,576	30·97	3,963,057	0·14	164,583,832	116/0
1859	104,267,884	3·62	1,050,845,836	36·52	7,768,564	0·27	179,182,355	125/5
1860	117,633,210	4·06	1,140,510,112	39·40	6,024,654	0·21	210,530,873	147/0
1861	92,795,737	3·18	958,696,816	32·84	4,613,689	0·16	217,485,024	150/2
1862	123,840,673	4·21	309,258,656	10·52	5,089,407	0·17	225,716,976	154/7
1863	113,449,703	3·83	428,230,768	14·47	5,368,226	0·18	248,919,020	169/5
1864	150,539,306	5·05	648,602,416	21·75	1,733,271	0·06	274,952,172	186/0
1865	129,761,317	4·33	675,069,360	22·75	4,586,260	0·15	271,072,285	182/2
1866	172,785,201	5·75	988,177,568	32·88	3,488,711	0·12	295,290,274	197/2
1867	142,951,240	4·73	911,910,496	30·17	3,947,634	0·13	275,183,137	182/6
1868	147,673,844	4·85	1,005,463,536	33·02	4,105,882	0·13	294,460,214	194/0
1869	141,853,383	4·61	948,298,512	30·81	2,524,215	0·08	295,450,214	192/1
1870	166,819,679	5·36	1,099,751,092	35·36	3,638,782	0·17	303,257,493	195/0
1871	184,412,542	5·73	1,406,281,520	44·64	4,961,500	0·16	330,754,359	210/0
1872	165,397,521	5·21	1,142,620,304	36·30	3,949,890	0·12	353,375,740	222/7
1873	189,824,608	6·12	1,318,087,232	41·19	2,718,322	0·09	370,380,742	230/3
1874	194,438,122	6·04	1,427,984,768	44·35	3,201,596	0·10	368,435,432	228/11
1875	189,059,859	5·84	1,233,200,864	38·06	1,939,019	0·06	373,941,125	230/10
1876	213,065,992	6·51	1,291,165,568	39·48	2,943,904	0·09	375,093,771	229/5
1877	218,546,900	6·62	1,188,365,920	36·01	2,784,453	0·08	393,941,256	238/9
1878	196,195,351	5·90	1,194,310,320	35·97	2,333,393	0·07	366,059,610	220/6
1879	167,793,165	5·01	1,287,063,568	38·42	2,517,273	0·08	362,127,741	216/2

COMMERCIAL AND OTHER STATISTICS OF THE UNITED KINGDOM.

Year.	TOTAL VALUE OF BRITISH AND IRISH PRODUCE EXPORTED.		SHIPS IN FOREIGN TRADE ENTERED INWARDS.		RAILWAYS IN UNITED KINGDOM.		
	£	Per Head.	Tonnage.	Per Head.	Capital Expended.	Per Head.	Nett Profit per cent
1853	98,933,781	71/6	8,943,107	0·32	263,636,320	190/7	3·80
1854	97,184,726	69/11	9,160,366	0·33	273,860,000	197/1	3·93
1855	95,688,085	68/7	8,951,239	0·32	293,903,000	210/8	3·90
1856	115,826,948	82/3	10,553,134	0·38	302,946,260	215/3	4·00
1857	122,155,237	86/2	11,475,199	0·40	311,153,670	219/5	4·19
1858	116,608,756	81/8	10,961,700	0·38	319,950,000	224/0	3·91
1859	130,411,529	90/4	11,221,922	0·39	328,219,100	228/2	4·13
1860	135,891,227	93/11	12,172,785	0·42	337,827,200	233/5	4·39
1861	125,102,814	85/8	13,179,589	0·45	352,386,100	241/4	4·30
1862	124,137,812	84/5	13,091,000	0·44	370,107,280	251/9	4·22
1863	146,602,342	99/1	13,256,063	0·45	387,246,200	270/8	4·25
1864	160,436,302	107/7	13,515,011	0·45	408,396,680	273/11	4·49
1865	165,862,402	115/1	14,317,886	0·48	433,558,100	289/0	4·46
1866	188,827,785	125/8	15,612,170	0·52	463,746,800	318/8	4·29
1867	181,183,971	120/0	14,827,617	0·49	479,167,300	317/4	4·18
1868	179,463,644	118/0	13,851,317	0·46	486,893,400	319/10	4·13
1869	190,045,230	123/7	14,485,945	0·47	490,950,770	319/4	4·45
1870	199,586,822	128/1	14,910,742	0·48	504,381,000	324/4	4·49
1871	223,066,162	141/1	16,455,842	0·52	520,400,000	330/5	4·69
1872	255,961,609	161/3	17,902,783	0·56	537,285,640	338/5	4·83
1873	255,073,336	159/5	18,791,963	0·59	569,047,346	355/8	4·75
1874	239,436,207	148/9	19,082,073	0·59	578,320,308	359/2	4·80
1875	223,494,570	138/0	19,027,827	0·58	590,223,494	361/0	4·72
1876	200,639,204	122/6	21,019,368	0·64	658,214,776	402/7	4·17
1877	198,731,073	120/4	22,131,476	0·67	674,059,048	408/7	4·13
1878	192,804,334	116/2	21,318,246	0·64	698,545,154	420/10	4·25
1879	191,503,672	114/4	21,099,344	0·63	720,000,000	429/10	.. Estimated.

COMMERCIAL AND OTHER STATISTICS OF THE UNITED KINGDOM.

Year.	DECLARED VALUE OF GOLD, SILVER, AND SPECIE.				BANK INTER- EST.	INCOME TAX.		
	Imported. £	Per Head.	Exported. Per Head.	Per Head.		Annual average percent.	Nett Amount Assessed for Property and Profits.	Per Head.
1853	Not registered prior to 1858.		18,906,755	13/8	3·43			
1854			22,586,568	16/3	5·11			
1855			18,828,178	13/6	4·78			
1856			24,851,797	17/8	5·83	268,338,109	190/7	
1857			33,586,968	23/8	6·66	274,114,003	193/4	
1858	29,493,190	20/8	19,628,876	13/9	3·03	292,694,508	204/11	
1859	37,070,156	25/9	35,688,803	24/10	2·74	293,666,988	204/1	
1860	22,978,196	15/11	25,534,768	17/8	4·18	299,232,578	206/9	
1861	18,747,045	12/10	20,811,648	14/3	5·21	301,345,865	206/5	
1862	31,656,476	21/6	29,326,191	19/11	5·53	317,070,986	215/8	
1863	30,030,794	20/3	26,544,040	17/11	4·40	323,949,129	218/11	
1864	27,728,276	18/7	23,157,515	15/6	7·35	326,696,050	219/1	
1865	21,462,211	14/4	15,210,994	10/2	4·75	349,301,654	232/10	
1866	34,287,139	22/9	21,970,687	14/5	6·90	364,430,553	248/6	
1867	23,821,047	15/9	14,327,289	9/6	2·54	374,342,902	247/11	
1868	24,862,595	16/4	20,220,014	13/3	2·10	386,542,366	253/11	
1869	20,500,991	13/4	16,391,999	10/8	3·20	389,421,002	253/3	
1870	29,455,668	18/11	18,334,450	12/2	3·04	398,222,811	256/1	
1871	38,401,327	24/3	33,760,671	21/5	2·88	419,850,798	266/7	
1872	29,505,319	18/7	30,335,861	19/1	4·10	434,802,952	271/9	
1873	33,454,724	20/11	28,899,285	18/1	4·79	453,585,000	283/6	
1874	30,380,268	18/10	22,853,593	14/2	3·70	481,002,000	298/9	
1875	33,284,789	20/6	27,625,042	17/7	3·24	498,260,040	307/7	
1876	37,057,353	22/8	29,464,082	18/0	2·61	503,676,578	308/7	
1877	37,162,534	22/6	39,798,119	24/1	2·88	490,344,908	297/2	
1878	32,421,490	19/6	26,686,546	16/1	3·77	493,598,158	297/4	
1879	24,065,656	14/4	28,609,912	17/1	2·51	500,000,000	298/6	Estimated.

Correspondence.

GILL'S PROCESS AND ITS COMMERCIAL RESULTS.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

City gentlemen of my acquaintance tell of a claim on my attention which they hold in common. A claim from that source commands my most respectful consideration in the *Sugar Cane*, with your generous permission.

Their claim may be thus stated. "Is it a mere question of technology that you are discussing, in which we can have no interest; or, are you allowing our interests to be absorbed in the relative value of the old process and your new process for clarifying cane juice? In a word, can the results affect our business in Mincing Lane?"

An explanation from this point of view can be offered in language sufficiently terse by retaining the statistics obtained and made known by competent judges.

As I can only regret that "it was not convenient," for those able manipulators in Demerara, to extend their crucial test, so as to determine the total product of sugar with my clarifying process, I apprehend I may fall back on what I have realised in a boiling-house practically. Nor will I indulge here to the full extent, but limit the increased product to 50 per cent. over and above the usual product, which usual product is obtained by imperfect clarification, by which, as is well known, they lose nearly as much sugar as they sell. It is by perfect clarification that loss is avoided, which becomes my gain of sugar.

In the Demerara experiment, 19,802 lbs. of sugar were obtained by the usual treatment in the vacuum pan. That sugar was estimated at £31 per ton, being "fine grocery Demerara crystals." Then the value of that sugar product might have been £274, thus affording sufficient practical evidence of the ability of my process to clarify cane juice, and produce a first-class sugar. *Now all the cane juice was clarified by coagulating and precipitating the contained natural impurities, not dissolving them as by lime to*

remain in union with nearly half the sugar, to become molasses ; it is this loss of sugar being avoided, by perfect clarification, which becomes my gain of sugar.

I limit this gain here* to 50 per cent. more than the usual product, having obtained more than that which others can repeat. Now the 19,802 lbs. of sugar becomes 29,703 lbs., and the £274 rises to £411.

Further, this process of mine qualifies indifference to competition, to this extent. The competitor may challenge the market until he reduces the £31 per ton to £21. Even then, this increased sugar product lands the planter in a better position than he would have been with the old shorter product at £31 per ton. If ever the beet sugar maker reduces his price as indicated, he will tremble with fear of a further fall, when the cane sugar maker will be perfectly at ease being satisfied with the margin of profit which my process affords. This view of the case can be applied to all concerned ; we therefore leave the beet sugar maker entirely at the mercy of the cane sugar maker, thus reversing that order of things which has so long disquieted all who are interested in the production of cane sugar, affording them now the superior commanding position.

Yours faithfully,

W. EATHORNE GILL.

45, South Hill Park, Hampstead.

Ponce, P. R., Dec. 22nd, 1879.

To THE EDITOR OF "THE SUGAR CANE."

Dear Sir,

Will you kindly insert the following, in answer to Mr. T. H. M., of Demerara.

In experiments, or in actual practice with quick and slow speed mills—the power, distance between the rolls, &c., being the same, the feed should be so regulated that the speed of the engine should not fall materially below that to which the governor is set, with open throttle.

In the letter referred to by Mr. T. H. M., I think I wrote somewhat to this effect, but I now write from memory, as my collection of the *Sugar Cane* was unfortunately lost a few weeks

ago, in the fire which destroyed the premises I occupied, but if I have not said so I intended to; and as Mr. T. H. M. says, it is evident that, everything else being the same, the feed in slow speed mills must be considerably heavier to absorb the power applied.

In conclusion, I may add, that in actual practice during the last seven or eight years with slow speed mills purposely designed, the results have been very satisfactory, giving an increased yield of from 8 to 12 per cent. over mills every way equal except in slowness of speed, and, although the increased strain brought to bear on these mills is very great, I do not know of one instance of a breakdown.

I am, dear sir, yours truly,

ROBERT GRAHAM.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

5294. FREDERIK WOLFF, of Copenhagen, Denmark. *Improvements in centrifugal extracting machines.* (A communication from Ole Christian Pedersen and Gottfried Eickhoff, both of Copenhagen.)

38. 1880. SAMUEL HENRY JOHNSON, F.C.S., Stratford, Essex. *Improvements in filter presses.*

ABRIDGMENT.

3948. JOHANN KROOG, of Halle-on-the-Salle, in Prussia. *An improved filtering apparatus.* The first part of this invention relates to the construction of filtering plates, to be used either without filtering media, or in conjunction therewith. The plates are made of a number of thin bars placed side by side, and separated by thin intermediate pieces at the top and bottom, and the whole series clamped together in a frame. Sometimes instead of the intermediate pieces, the bars themselves are slightly cut away in the central part, so that when tightened up they fit closely at either end, leaving long narrow slits for the fluid to escape. Apertures in the bars being placed in a line form transverse tubes connecting the said slits. The rest of the invention relates to the construction of the feeding and lixiviating pipes, so as to obtain a minimum of tightening surfaces. For example, in a six-chambered frame filtering apparatus, which has seven filter plates, each frame has connected to it a small pipe leading to a section of the main feeding pipe, the

first section being secured to the foundation of the apparatus, and connected to a tightening apparatus at the end of the last section, which is closed by a cover, against which a tightening screw acts, thus having only six tightening surfaces for the feeding pipe. When the apparatus is to be used only for filtration, each plate is formed with a tap connected to the lowest transverse tube for the escape of the expressed fluid; but when used for lixiviation also, the said tube of the second, fourth, and sixth filter plates are provided at the ends opposite the taps with short open pipes, against which are tightened by suitable means pipes leading from a main pipe running the whole length of the apparatus, which pipe turns on a pivot when it is desired to move the plates. Corresponding air-valves are provided in the said plates for the escape of the air when the lixiviating fluid is admitted to the apparatus. Thus it is evident that there are only three tightening surfaces in the lixiviating pipes.

AUSTRIAN.

Patents issued in August, 1879.

2392. A. BOURY and C. BERTAUX, of Etricourt, France. *An arrangement of direct pressure pipes in the air-pumps of sugar works.*
2440. E. ERNST, of Beesenlaublingen. *Obtaining manure of spent molasses.*
2484. H. HAUCH, of Vienna. *A process of diffusion and pressing cut beetroot.*

BELGIAN.

49905. O. LICHT. *A machine for purifying certain juices.*
49913. WEGELIN & HUBNER. *Screw-fasteners for his filter presses.*
49919. O. LICHT. *Treatment of sugar juice.*
49929. L. C. E. FAUCHEUX, of Brussels. *Manufacturing sugar or purifying molasses.*
49930. L. C. E. FAUCHEUX, of Brussels. *A filter press.*

COLONIAL (NEW SOUTH WALES).

ALEXANDER RICHARD MACKENZIE. *Mackenzie's ejector vacuum-pan.*

ALEXANDER RICHARD MACKENZIE. *Mackenzie's vacuum curing-box.*

FRENCH.

131546. BELCHEE. *Processes and apparatus for filtering solutions and other liquids.*
131710. FAURE. *Treatment of sugar cane.*
131859. DUCHAMP, of La Capesterre (Guadalupe). *An automatic cane-cutter.*
131860. DUCHAMP, of La Capesterre (Guadalupe). *A diffusion apparatus with open air.*
131894. BONNEFIN, of Paris. *An apparatus for preparing, evaporating, and concentrating sugar juice and other liquids.*
131951. DERUE and BLANCHET. *New processes for sugar works.*

132018. SONALET, of Bordeaux. *An apparatus for cleaning, clarifying, colouring, decolouring, composing, and decomposing liquids, and for collecting the substances they contain in a suspended or combined state.*

132021. JOUIN & GEAY, of Paris. *An apparatus for cutting green or dry plants, and chiefly sugar cane, into different shapes.*

132035. CHAMONNOIS. *Extracting beet juice by maceration.*

132036. DELAUNY, of Paris. *An instrument called "sacchar-alcoholometer."*

CERTIFICATES OF ADDITION.

115950. FAURE. *An apparatus for barking sugar cane.*

131307. LEGRU. *Treatment of saccharate of lime.*

128108. SAVARY & Co. *Extracting ammonia from the wash of molasses.*

GERMAN.

8709. R. PZILLAS, of Brieg. *A process and apparatus for pressing turbine sugar in a moist state into all shapes by concussion.*

8761. J. MARX HEINE & Co., of Leipzig. *A flexible diffuser of soft and vulcanized caoutchouc.*

AMERICAN.

221923. OTTO H. KRAUSE, of Jersey City, New Jersey. *Improvement in centrifugal apparatus for forcing volatile or corrosive liquids through or from sugar or other substances.* The object of this invention is to prevent damage or loss by the evaporation of volatile or corrosive liquids used in liquoring or washing sugar and other substances in the centrifugal machine; and the apparatus consists of a tight chamber divided into two compartments, one of which is the receiving chamber for the sugar and for the treating liquor, and is divided from the other compartment by a perforated plate or wall. The second compartment is intended to receive the liquor as the centrifugal action drives it from the sugar. A plate slanting from the bottom of the perforated wall towards the opposite side of the second chamber, and nearly touching the top, prevents the liquor from flowing back into the first compartment. The apparatus may be sector-shaped, like the sugar moulds of a centrifugal machine, or it may be cylindrical, and constitute a revolving drum. In the case of the drum being mounted on a horizontal spindle, the inclined plate would be in two pieces, sloping away from the perforated plate, and leaving an annular space between for the escape of the liquor. Suitable openings are provided for feeding and emptying the apparatus.

221924. OTTO H. KRAUSE, of Jersey City, New Jersey. *Improvement in centrifugal apparatus for forcing volatile or corrosive liquids through or from sugar or other substances.* This invention differs from the preceding one in that the tight chamber is divided into three compartments. There is no inclined plate in the second compartment, but the liquor flows of its own weight into a third compartment below the two first, and is thus kept from returning into the sugar.

222508. OTTO H. KRAUSE, of Jersey City, Assignor to Edward E. Quimby, of Orange, New Jersey. *Improvement in methods of colouring sugar.* The method consists in mixing an excess of colouring matter, preferably in a state of dry powder, with a small quantity of powder, and in mixing this highly coloured powdered sugar, when dry, in any required proportions, with the sugar to be coloured. For example, one pound of violet ultramarine mixed with about twelve pounds of powdered sugar, is considered sufficient by the inventor to whiten thirty thousand pounds of soft sugar.

222942. FELIPE PEREZ DE LA TEGA, of Havana, Cuba. *Improvement in evaporating pans.* This is a pan or boiler provided with a trough all round it, which retains the scum that boils over, and also serves as a flange to support the pan on the furnace. The pan is so set in the brickwork that two spaces are left, one at each end of the pan, and one of the spaces communicates directly with the furnace. Pipes, forming flues, run the length of the pan, thus effecting a communication between the two spaces. The first space is provided, near the top, with a plate, which prevents the heat from escaping otherwise than through the pipes, and the second space is covered at the top. The heated air has therefore to return through another set of pipes or flues leading to the first space, but having their openings above the plate. Suitable pipes are provided for emptying the pan and for the escape of any liquid which boils over into the surrounding trough with the scum.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To JAN. 17TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	74 ..	44	16 ..	9	16 ..	10
Liverpool ..	45 ..	29	10 ..	15	9 ..	9
Bristol	2 ..	4	1 ..	4	1 ..	2
Clyde	30 ..	31	8 ..	11	11 ..	11
Total ..	151	108	35	39	37	32
Increase..	43		Decrease..	4	Increase..	5

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST DEC., FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
160	92	8	41	1	302	282	288

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST DEC., IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
980	290	35	294	217	1816	1723	1582

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	300,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	400,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	365,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland ..	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	50,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,865,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

On the re-opening after the Christmas and New Year's holidays, there was rather a brisker demand for both raw and refined sugar, which, however, was soon satisfied; and grocers having supplied their most pressing wants, the market relapsed into a state of stagnation. As refiners under these circumstances find but a slow sale for their produce, they have bought only limited quantities of cane sugar, eking out their requirements by German and Austrian beet, which is readily obtainable at 24s. for 88 per cent. as a basis.

The stocks of sugar on the 24th January were 151,100 tons, being 41,500 more than at the same period last year, but 1500 tons less than on 1st January.

The consumption of sugar during 1879 will most probably prove to have been in excess of any previous year.

French loaves are quoted 3d. to 6d. lower than last month.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 24s. to 24s. 6d., against 24s. 6d. to 25s.; good to fine grocery, 26s. to 27s. 6d., against 26s. 6d. to 28s. 6d.; Martinique crystals, 29s. to 30s., against 30s. to 31s.; No. 12 Havana, 26s. to 26s. 6d., against 26s. 6d. to 27s.; fair to good refining Cuba Muscovados, 24s. to 24s. 6d., against 24s. 6d. to 25s.; middling to good brown Bahia, 20s. 6d. to 21s. 6d., against 21s. to 22s.; good to fine Pernambuco, 21s. 6d. to 22s. 6d., against 22s. to 23s.; Paris loaves, 30s. 6d. to 31s. 3d., against 31s. to 31s. 6d.

THE SUGAR CANE.

No. 128.

MARCH 1, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

SCHEME FOR AN INTERNATIONAL SUGAR CONVENTION.

II.

Having given an abstract of the introduction to the pamphlet published by the French Sugar Manufacturers' Committee under the above title, we now add a summary of the principal points in the documents which form the body of the work.

1. Petition of the Central Committee of French Sugar Manufacturers to the Ministers of Finance, Commerce, and Foreign Affairs, dated 29th October, 1879.

The Committee begin by stating that the troubles of their sugar trade arise from the bounties given in the form of drawback, and that the simplest way of putting an end to such a system would be for all countries which tax sugar to place its manufacture and refining under excise supervision, and to levy duty only on the sugar which enters into home consumption, so that that which passes the frontier, having paid nothing, will have no claim to drawback.

The refiners have now declared themselves ready to accept refining in bond, with the imposition of a countervailing duty on bounty-fed sugar from non-contracting countries.

The committees representing the sugar industries of Belgium and Holland have fully concurred in this arrangement.

The delegates of the British colonies and refiners have given evidence before their Parliamentary Committee to the same effect.

The divergence of views which has hitherto hindered the progress of negotiations is therefore removed.

The danger involved in export bounties threatens consumers as well as producers, since such a system cannot fail to suppress sources of supply placed under such unequal conditions.

A Convention on the basis indicated would, therefore, not only satisfy the desires of producers, but would establish perfect freedom of trade in sugar.

"A countervailing duty is simply a safeguard against insidious "tariffs, which create factitious inequalities, unjustifiable from all "points of view."

With respect to non-contracting countries, it would also prove "an efficient invitation to enter within the pale of the Convention, "and renounce the egotistical calculations of a policy of isolation."

The Committee therefore pray their Government "to renew the "negociations which were so nearly successful in 1875 and 1877, "limiting them in the first instance to the four countries in which "a solution has been already prepared by means not only of "anterior negotiations but also of the agreement to which all the "interested parties have now come. Access to the Convention "concluded between the four Powers would remain open to all "who might desire to adhere to it in the future."

"The question is ripe, and we think that a slight effort of our "diplomacy would suffice to bring about an international agreement which would have, among other good effects, that of "replacing the sugar trade on the basis of loyal competition and "of liberty."

2. Extracts from Minutes of Sittings of the French *Fabricants'* Committee, 9th and 10th June, and 2nd July, 1879.

The various steps in the agreement between the French refiners and the *fabricants* are here given. The names of the refiners present or represented include all the large refiners of Paris.

The delegates of the *fabricants'* Committee, on their return from giving evidence before our Parliamentary Committee on sugar industries, report that "the ideas which they were charged

"to support have obtained serious partisans in England and in numerous British colonies, and if the French Government would undertake a diplomatic campaign in favour of a Convention, bringing to it a spirit of resolution and a desire for success,—which was perhaps somewhat wanting in our negotiations of 1875 and 1877,—the difficulties would soon be got over."

3. An extract from the minutes of evidence given before the Select Committee on sugar industries gives the important statement of M. Fouquet, who was authorised to give evidence as to the agreement between the Paris refiners and the French Sugar Manufacturers' Committee, that the refiners now accept refining in bond.

4. Declaration of the President of the Dutch Sugar Manufacturers' Committee.

This states that the Dutch Committee have taken note of the agreement come to between refiners and *fabricants* in France, and that the Committee adheres to the object of that agreement, viz.: the abolition of all export bounties on sugar; and to the means proposed, viz.: the manufacture and refining of sugar in bond, with a countervailing duty on all sugar still receiving a bounty.

The Dutch Committee believes that the only international Convention which could give security to producers and refiners must be based on a complete disappearance of bounties in all producing countries, "and that this disappearance of bounty can only be obtained by the levying of the duty at the moment when the sugar goes into consumption, that is by working in bond."

"We also share the opinion that a surtax levied on sugars coming from non-contracting countries is no violation of the principles of Free trade; it attacks only the protection accorded to an industry, the sole obstacle to legal and honest competition. "In adhering, therefore, to the agreement come to in France, we consider that we are defending the interests of true liberty and justice, and we are determined to join you in pursuing its realization."

5. Declaration of the President of the Belgian Committee.

The Committee are glad that an understanding has been come to by the sugar industries of France, Holland and Belgium, and will be ready to take part in any efforts to induce the Governments of the four countries to agree on a complete realization of this programme.

They consider that it is for the French Government to take the initiative for a Conference of delegates of the four countries.

6. These views are conveyed to the Belgian Finance Minister in a petition, dated 3rd December, 1879.

7. *The Austrian Bounties.*—This is a reproduction of the calculation of the amount of the Austrian bounty in 1879-80, which has already been laid before the Select Committee on sugar industries, and a translation of which appears in the appendix to the minutes of evidence.

The duty is levied on the estimated quantity of roots worked. It is equivalent, in gold, to 15 francs 20 cents per ton of roots.

The estimation of the quantity of roots worked was effected last year (1878-9) by assuming that the vessels in which the juice is extracted from the roots were capable of treating, in the 24 hours, 1100 kil. of roots for every hectolitre of capacity. In point of fact these vessels treated from 30 to 50 per cent. more roots than this estimate would give. On the average, therefore, the manufacturers only paid 60 per cent. of the duty on the quantity of roots actually worked. The legal duty of 15 francs 20 cents. per ton (1000 kilos.) of roots is equivalent, at a yield of 9 per cent. of sugar, to 16 francs 90 cents. per 100 kil. of sugar. As 40 per cent. of the roots actually worked evaded the duty, the real duty paid was only 10fr. 14c., the drawback being 22fr. 75c.

But the Austrian Government, having found in former years that the drawback paid on exportation amounted to, and even exceeded, the total amount of duty levied, endeavoured to avoid so unfortunate a result for the Treasury by passing a law, in 1878, that the sugar duty must produce a minimum sum of six million florins, equivalent, at par, to 15,000,000 francs; and that this minimum should be increased every year by 500,000 florins, until

it reached a total of 10,500,000 florins. The duty levied in 1878-9 amounted to a sum equivalent to . . . 51,600,000 francs.

The drawback on export amounted to 47,385,000 ,
leaving a balance for the Treasury of 4,215,000 ,

A further sum of 10,785,000 francs would therefore have to be claimed from the manufacturers to make up the new legal minimum of 15,000,000 francs. This sum, on 424,000 tons of sugar, would represent, in gold, 2fr. 12c. per 100 kil.

The total duty paid would therefore be 10fr. 14c. + 2fr. 12c., or 12fr. 26c. per 100 kil. of raw sugar. The drawback being equivalent, in paper, to 22fr. 75c. (equal to 19fr. in gold), the bounty on export amounted, in 1878-9, to 6fr. 74c. in gold per 100 kil. of raw sugar.

The above duty on the raw sugar is equivalent to a duty of 14fr. 71c. on refined. The drawback on refined is equivalent, in paper, to 27fr. 95c., or 23fr. 30c. in gold. The bounty on the export of refined amounted, therefore, to 8 fr. 59c. per 100 kil.

In the present season, 1879-80, the basis on which the quantity of roots declared for duty is calculated has been raised from 1100 kil. of roots per hectolitre of capacity of the vessels, to 1800 kil. The minimum duty to be received has also been raised from 15,000,000 to 16,250,000 francs.

In the meantime, the manufacturers have altered their machinery, and have substituted vessels which, though smaller in capacity, will work more roots in proportion to that capacity. Thus an apparatus with a capacity of 90 hectolitres is now estimated to work $90 \times 1800 = 162,000$ kil. of roots in the 24 hours, and the duty is charged at that rate; but it really works 200 to 220,000 kil. The average excess of roots worked, beyond those charged with duty, is therefore taken to be 25 per cent., as against 40 per cent. in 1878-9.*

Francs.

At this rate, the duty received will amount to . . . 64,500,000

The drawback, at the same rate of exportation as

last year, will be, as before 47,385,000

The Treasury will therefore receive 17,115,000

* As the roots already declared for duty this season are actually less than those declared last year, this estimate is evidently too low.

and there will be no occasion to enforce the collection of the legal minimum.

As 25 per cent. of the roots actually worked will evade the duty, the duty paid, per 100 kil. of raw sugar, will be only 12fr. 67c., and, the drawback being 19fr., the bounty on export will be at the rate of 6fr. 33c. per 100 kil. In the same way, the export bounty on refined will be at the rate of 8fr. 10c. per 100 kil.*

In spite, therefore, of the increase in the estimated capacity of the apparatus, and in the legal minimum, the export bounty in 1879-80 will be about equal to that of the preceding season.

8. Countervailing duties exist in England.

This chapter shows that the principle of a countervailing duty already exists in this country. The countervailing duty on spirits was established "in order to restore equality of situation between English distillers and those of other countries." A countervailing duty on bounty-fed sugars is proposed on exactly the same principle, "to restore equality of situation between sugars receiving an export bounty from their respective Governments, and sugars receiving no bounty, such as those from the English colonies, and the French raw sugars."

"We cannot but think that the English Government, with its practical spirit, will recognize the identity of the two cases and apply to the same evil a remedy which has already answered so well."

9. The "most favoured nation" clause is not contrary to the establishment of countervailing duties.

This clause leaves nations at liberty to make special Conventions. They are only bound, in such cases, to give to those with whom they have entered into such an engagement the right to obtain conditions equal to those of the most favoured.

Thus, in virtue of the Sugar Convention of 1864, the sugars included in the Convention entered freely into all the contracting

* We have altered the figures in the original document, because we consider it incorrect to subtract the duty estimated in gold from the drawback estimated in paper.

countries. Nevertheless, German sugars, which were not included in the Convention, were charged, on their entry into France, in spite of the "most favoured nation" clause in the treaty of Frankfort, with customs duties equal to those on other sugars outside the Convention.

The terms of the draft Convention of 1875 were drawn up and signed by France without giving rise to any objection on the part of Germany, who had, like Austria, been invited to take part in it. And yet, by this Convention, Germany would, in spite of her right to be treated on an equality with the most favoured nation, have continued to pay customs duties on the entry of her sugars into France, from which the sugars included in the Convention would have been exempt.

The benefit of the "most favoured nation" clause can, therefore, only be claimed on complying with whatever condition may be attached to it, such as, in the present instance, the abolition of all export bounty on sugar.

Those who have a right to the treatment of the most favoured nation can only claim to enjoy the same advantages under like conditions.

THE SUGAR BOUNTIES BEFORE THE SELECT COMMITTEE OF THE HOUSE OF COMMONS.

CONTINUATION OF THE EVIDENCE.

Mr. WALPOLE, in the course of his further cross-examination, explained why, in one of his reports, he had recommended that any measures for the suppression of export bounties should be directed against all sugar exported with *drawback*. By that arrangement he considered that all countries would be treated in the same way under the same conditions, disputes as to varying amounts of bounty would be avoided, and the stipulation of the "most favoured nation" clause complied with. He quoted many instances of such an arrangement in our existing legislation, and called attention to the recent orders in council in reference to the importation of cattle, by which perfectly sound cattle would have

to be slaughtered on importation here if disease existed in the exporting country. It being now admitted that, in the case of sugar, export bounties are involved in the payment of drawback, he contended that the existence of a drawback—just as, in the case of cattle, the existence of disease—would be a good and sufficient ground for making a special regulation. In his opinion the object of the “most favoured nation clause” was to put all countries on an equality. France was at present subjected to a wrong in our markets, by the importation of bounty-fed raw sugar from Austria.

Absolute accuracy was impossible, as was shown in the existing case of the countervailing duty on spirits.

As to the interests of the consumer, he pointed out that buying an article below cost price put him in a very bad position, by making him dependent on an artificial supply. He had no more right to buy sugar below cost price than a thief had to the half-crown which he steals. It might be true that it was no immoral act on our part to participate in the robbery which is being committed abroad upon the French taxpayers, but certainly our consumer was not entitled to any sympathy under such circumstances. He had no rights in the matter; whereas those producers who suffer by the sale of sugar below cost price certainly had. He agreed with the principle, *Salus populi suprema lex*; but he did not agree that the consumer of bounty-fed sugar had rights beyond the unsubsidized producer.

The case of the paper makers, far from being parallel with that of the sugar producers, was the converse.

The minutes of the Conferences showed that the foreign Governments do not, as we do, regard the giving of a bounty as a disadvantage. Any step towards the reduction of the loss to their Treasury they invariably spoke of as another “sacrifice,” another “concession.” He considered that the assistance of England was indispensable to these foreign countries, in bringing about a solution of their difficulties in this matter. If Her Majesty’s Government showed that they were determined to make their policy efficacious, he thought there would be no difficulty in bringing Austria and Germany to terms.

In his opinion the countries which give us the "most favoured nation" clause do so in their own interests. Austria might have a motive in protecting her own industries against the world, but that she should let her own industry be undersold by a Frenchman and not by an Englishman was almost inconceivable. Therefore, the giving of the "most favoured nation" clause was really giving nothing at all.

The price to the consumer would be raised to precisely the same amount, whether the bounty were abolished by treaty or counter-vailed by an equivalent duty. One of the principles which had been insisted upon by more than one of the Ministers who had spoken on the subject, was that it is not for the ultimate benefit of the consumer that he should buy his sugar below cost price. Therefore, while the present low price of sugar may be a present benefit to the consumers, it was dearly purchased at the cost of a probable large increase of price in the future.

A large quantity of our sugar came from our own colonies and other countries in which there was no export bounty; therefore a large part of the present reduction of price to the consumer came out of the pockets, not of the bounty-fed producers, but of those who receive no bounty at all. With regard, therefore, to the "robbery" which is involved in export bounties, a large proportion of the spoil went into the pockets of the British consumer out of the pockets of unoffending British subjects.

The prices of raw sugar in England and France were practically the same, apart from the question of freight, and therefore the English refiner had no advantage over the French refiner in being able to buy Austrian bounty-fed sugar.

Mr. MARTINEAU, in his further cross-examination, stated that since the Committee began its sittings Mr. Duncan had been obliged to close his loaf-sugar refinery and discharge all his men. The French refiner paid just as low a price for his raw sugar as we did, in fact rather lower. The Austrian bounty merely cheapened raw sugar all over the world. If it were abolished the British refiner would be in no better position, as compared with the French refiner, than he is now. They were now both working

on a raw material at the same price. The British refiner were not working on some specially cheap article, as compared with the French refiner. If the Austrian bounty were taken off, and if the result were, as we may presume, to reduce the production in Austria, it would simply raise the level of the value of sugar all over the world,—in France no less than in England. In point of fact, the price of Austrian raw sugar, laid down in London, was at that time a fraction higher than similar French raw sugar laid down in Paris. France exported raw sugar largely; therefore her market must inevitably be on a level with the markets of other countries. The exports from Germany and Austria must, of course, bring prices in other countries down to their level, and we constantly found French refiners competing with us for sugar from other countries, such as Cuba and Java. This was another proof that all markets were on a level.

In addition to the bounty which the French refiner obtained from the excess yield of his raw sugar, he got a bounty of 4fr. 80c. on the *poudres blanches* (white crystallized sugar from the beet root factories) of which about 112,000 tons were used by refiners in the course of the year. M. Lebaudy, one of the largest Paris refiners, had admitted that this extra bounty amounted to 2 fr. 90c. per 100 kilos.

In his opinion the sugar-refiner's interest and the workman's interest were small compared with the question of the stoppage of the natural supplies, and the much more important question involved in that, of the interest of the consumer.

Exports of refined sugar from abroad always meant loaf sugar, in one form or another. Therefore there would be no difficulty in drawing the distinction between raw and refined, if it were desired. But practically no such distinction would be necessary. Foreign countries might adopt means for giving bounties on exportation of moist refined sugar. This was a danger which was always hanging over our heads, and threatening our moist-sugar industry.

The fact of a bounty being obtained by the French and Dutch refiners might be illustrated by comparing the price now given by them for Cuba centrifugal sugar with the price at which they sold

their loaf-sugar. They were then giving 22s. 6d. per cwt. for that description of raw sugar, from which they extracted 103 lbs. of loaf sugar and 8 lbs. of molasses. The loaf sugar they were selling at 24s. 3d. per cwt., and the molasses at 5s. per cwt. They were therefore getting a gross return of 22s. 8d. from the raw sugar for which they paid 22s. 6d. The working expenses would be at least 2s. 6d. per cwt., and the expense of bringing the Cuba sugar to Paris would certainly raise its cost to 23s. The total cost would therefore be 25s. 6d. and the gross return 22s. 8d., giving a net return of loss of 2s. 10d. per cwt. This loss was converted into a profit by the bounty resulting from the duty on the raw sugar being under-estimated. The Dutch refiner still had his raw sugar assessed with duty according to its colour. It was said in Holland that this high-yielding sugar was sometimes assessed as fourth-class sugar, *i.e.*, as only yielding 67 per cent., when it really yielded 92 per cent.

In re-examination, he again showed that M. Leon Say was in error in omitting from the note addressed by him to the Committee any reference to the bounty obtained by the use of *poudres blanches* in the French refineries. This note stated that out of 158,000 tons entered for home consumption, 111,000 tons were *poudres blanches*. The evidence of the French refiners, in 1872, proved that one-third of the sugar melted by them consisted of *poudres blanches*, which, though nominally declared for home consumption, really entered, in that proportion, into the composition of all the loaf-sugar produced. These *poudres blanches* were practically pure sugar, and ought, therefore, to pay a duty of 75fr., but they only paid 70fr. 20c. The refiners, therefore, obtained a bounty of 4fr. 80c. This bounty, though ignored by M. Say, was admitted by the refiners themselves, as shown by M. Lebaudy's present calculation, and by their evidence before the Superior Council of Commerce in 1872.

He read an extract from the *Times*, showing that heavy losses were being sustained by sugar estates in Mauritius.

The French deputies from French sugar-producing colonies had made representations in the French Chamber on the export bounty question.

The falling off in the beetroot crop in 1876-7 was only 270,000 tons, out of a total known consumption throughout the statistical world of 3,370,000 tons; and yet it caused a rise of 50 per cent. in the value of sugar. This indicated what would happen to the consumer if he became entirely dependent on bounty-fed supplies.

The fact that the agitation against export bounties was originally set on foot by the moist-sugar manufacturers showed how they feared that their industry might be attacked.

The assertion that increase in trade is not always a sign of prosperity, had been proved in Bristol. Their manufacture increased rapidly up to 1875. In that year the imports amounted to nearly 100,000 tons, and immediately afterwards fell off to 43,000 tons. As Messrs. Finzel's works were closed in 1876, when all their large capital had been lost, it was evident that the increasing business of the preceding years must, to a certain extent, have been carried on at a loss.

The British exports of refined, consisting entirely of moist sugar, had been steadily declining. The British refiners exported less than 8 per cent. of their manufacture, while the French refiners exported 50 per cent., and the Dutch 75 per cent.

The growth and manufacture of beetroot sugar would be a profitable industry in this country, and a very important assistance to the British farmer and agricultural labourer, if sugar were not depressed below its natural price by the foreign export bounties. It had been shown that roots superior to those grown in France could be grown in this country. It was not an exhausting crop, and was very favourable to the growth of wheat. The cultivation of beetroot improved the soil, and raised the character of the farming generally. It gave employment in the winter time to the rural population. As cattle food, one ton of the pulp was equal to two tons of mangold wurzel. If there were no export bounties, manufacturers of beetroot sugar in this country could afford to give 20s. per ton for the roots,—a price which would, in good seasons, leave a very fine profit to the farmer.

The reason of the largely increased exports of moist refined sugar to Canada of late years was that the Canadian legislation had

stopped sugar-refining in Canada. Moist refined sugar was a speciality of this country, and therefore when the Canadians gave up making it themselves they were obliged to come here for it.

He showed that Sir Louis Mallet's theory, that more refined sugar came here because consumption had decreased on the continent, was erroneous. The continental consumption had largely increased; from 580,000 tons in 1872, to 829,000 tons in 1878.

SIR LOUIS MALLET BEFORE THE SELECT COMMITTEE ON SUGAR INDUSTRIES.

In the *Sugar Cane* for December there appeared, in parallel columns, the statements made by this witness, compared with the facts elicited from him in cross-examination.

As to the Convention of 1864, he stated, as one of the original negotiators, that it was quite impossible of execution. In cross-examination, he admitted that the point which France did not carry out was the putting of her duties in correlation with the yields. He had no doubt that France might have done so.

The witness entered into an elaborate statement, with the view of showing that the sugar trade of this country is suffering no injury from the export bounties. His four important points in proof of this were, the importation and exportation of raw sugar, the importation of refined sugar, and the exportation of British refined sugar. In cross-examination he admitted that a large importation from bounty-fed countries could not indicate prosperity in our colonial sugar trade; that an increased importation of foreign refined sugar indicated the reverse of prosperity in our home sugar-refining trade; and that the exports of raw sugar had nothing to do with the subject.

Facts as to imports and exports were stated by the witness, with the view of proving that the trade is most prosperous in all its branches. He attempted to show that imports and exports of raw, foreign refined, and British refined, were steadily increasing. In cross-examination, he admitted that the years 1876-7 were quite

exceptional ; that the imports of raw sugar were now falling off ; that an increase of 1000 per cent. in the importation of foreign refined sugar was no indication of the prosperity of the British refining trade ; that the present exports of raw are no larger than they were in 1862 ; that the exports of refined have fallen every year since 1876 ; and that the re-exportation of foreign refined from this country has fallen 40 per cent. since 1875.

If there were any depression in the British loaf-sugar refining trade, the witness attributed it (1) partly to the substitution of other sugar in the consumption, and (2) partly to the diminished consumption of sugar on the Continent. In cross-examination he admitted (1) that he was not aware of any decrease in the consumption of loaf-sugar ; (2) that he was not aware that the consumption of continental Europe had increased from 679,000 tons in 1875, to 825,000 tons in 1878 ; that, therefore, neither of the causes to which he attributed the depression in the British loaf-sugar refining trade would hold good.

The witness assured the Committee that he was not aware of any other cause for the depression. In cross-examination he admitted that if loaf-sugar came over here with a bounty, and so was sold under cost price, it would have a very depressing effect on the loaf-sugar refining trade of this country.

But the witness, in his original evidence, went further than denying the existence of any cause for the disappearance of loaf-sugar manufacture in this country. He propounded a theory that if the French and Dutch refiners use only a particular class of raw sugar, all the rest of the raw sugar in the world must be artificially cheapened. From this he drew the conclusion that British loaf-sugar makers, instead of disappearing, ought to be making an extra profit. This theory, if it means anything, means that the French and Dutch refiners give an extra price for the 500,000 tons of raw sugar which they refine, because that sugar gives them a bounty on the 250,000 tons of refined sugar which they export ; that this causes the remaining three millions of tons of raw sugar to be sold so much cheaper that the British refiner can not only compete against the export bounty, but also secure a profit. According to

Sir Louis Mallet, then, the export bounty on 250,000 tons of French and Dutch loaf-sugar depresses the price of 3,000,000 tons of raw sugar by at least a pound a ton. The witness admitted, in cross-examination, that the quantity of sugar used by the French refiners is a very small proportion of the total production of the world; that to whatever extent the price of raw sugar may be reduced, refiners all over the world would get the benefit of it; that there cannot be two prices in the same market for the same article; and that competition will keep any kind of sugar down to its natural price.

In amplification of his assertions as to increased importations, the witness proceeded to state that countries forming part of the British possessions were sending larger supplies to this country. He also compared the average imports of sugar from various sources for the years 1873-4-5, with those for the years 1876-7-8, and concluded that all showed a large increase, except Brazil, the British West Indies, and the Spanish West Indies. In cross-examination he did not know to what British possessions he referred; he quite abandoned the year 1877, it being of an exceptional character; he admitted that 1877 was included in his second triennial period; increased imports in that year did not arise from increased production; China and India sent extra supplies in that year,—and in that year only,—owing to the artificially high prices caused by a partial failure of the beetroot crop; he admitted that the exceptional character of the year 1877 upset the inferences he had drawn; also that the imports from the British and Spanish West Indies might amount to quite half of our total imports of raw sugar.

The witness did not produce a similar comparison showing the increase in importations from bounty-fed countries. He promised but failed to do so. In cross-examination he admitted that an increase in the production of bounty-fed sugar, from 672,000 tons in 1868, to 1,415,000 tons in 1878, was very large.

The witness proceeded to attribute the disadvantages under which West Indian sugars labour, in competing against bounty-fed sugars, to the facts that our sugar duties had been abolished, and that uniform, or nearly uniform duties existed on the continent.

In cross-examination, he admitted that he was not at all informed as to the present state of the continental tariffs; he was not aware that a complete graduated scale of duties existed in Belgium, Holland, and America; he had no kind of knowledge of the class of sugar produced in each colony.

Coming to the question of a countervailing duty, the witness began by speaking of it as a means of compensating the refiner and West Indian planter for the disadvantage they may suffer from the export bounties. But, in cross-examination, he admitted the object to be simply to restore the free trade level by countervailing the bounty. Such a duty would, he maintained, involve a considerable burden to the British consumer and the British tax-payer. But, in cross-examination, he admitted that the tax-payer would be in the same position as before; and that, as to the consumer, if the effect of the bounty be to reduce the price, its abolition would of course raise the price to the same extent, whether that abolition were accomplished by negociation or a countervailing duty. The object of all the negotiations had undoubtedly been the abolition of the bounty.

Sir Louis Mallet then propounded a very remarkable objection, on the ground of principle, to a countervailing duty. But he began by assuming the principle to be, that the conditions of production should be equalized whenever they have been rendered unequal by the legislation of a foreign country. This definition he was obliged to abandon in cross-examination, being constrained to admit that what the sugar industries confined themselves to demanding was equality of competition with foreign countries in our own markets. Their complaint did not, therefore, apply to a foreign import duty, which injures our goods only in that one foreign market, leaving the other markets of the world open, including our own.

Arguing from his erroneous definition, he inferred that if it be right to countervail a bounty by a duty, it must also be right to countervail a duty by a bounty. In cross-examination he admitted that these two policies would be diametrically opposed, since the one would collect the bounty and distribute it over the general body of

taxpayers, while the other would undoubtedly take money out of the pockets of the taxpayers.

Still further developing his fallacious theory, he maintained that countervailing a bounty would be a more expensive proceeding than giving one to countervail a foreign import duty. He gave no proof of this, and in cross-examination was obliged to admit that the effect of a bounty on a portion of the sugar we import must be to depress the price of the whole; that, therefore, the producers of other sugar have to sell it so much cheaper than they otherwise would, *i.e.*, have to contribute a certain sum out of their own pockets towards the artificial reduction in price; and that, therefore, the artificial benefit to the consumer is in great part paid by one class of British subjects into the pockets of another class,—that is, by the British grower of sugar to the British consumer of sugar. It is, therefore, clear that the only loss involved in countervailing an export bounty is the loss to the consumer of the artificial cheapness it gives him, a great part of which he obtains at the expense of producers who receive no bounty.

The witness called this a loss of two millions, and compared it with the insignificant capital involved; but admitted, in cross-examination, that the artificial cheapening of sugar affects producers everywhere, and that a very large capital is therefore at stake.

Referring to the "most favoured nation" clause, he maintained that to levy an uniform countervailing duty on differing rates of bounty would be extremely impolitic, as likely to weaken the effect of a vitally important stipulation. In cross-examination he was informed that Mr. Gladstone and others had laid down the principle that, under the "most favoured nation" clause, we were only bound to treat those countries alike which came under like conditions.

The difficulties in applying a countervailing duty would, in his opinion, be very great, and would give rise to irritating controversies. And yet, in cross-examination, he admitted that Article XIX. of 1864 means that the high contracting parties should be at liberty to come to an understanding, not as to whether there

should be a surtax, but as to the surtax to be imposed. He further admitted that he did not in any way dissent from that policy either in his report or during the Conferences.

This is the nature of Sir Louis Mallet's evidence. It must be admitted that the only witness who has yet been produced in opposition to the contentions of the sugar trade has completely broken down on every point. The line he took was exactly similar to that adopted by all previous opponents. The thorough way in which his cross-examination has destroyed his case must, therefore, be regarded as an important and conclusive victory for those whom he was called upon to overwhelm. It must be noted that some points, originally made much of, were as carefully avoided by Sir Louis Mallet as they had been by every member of the Select Committee. We used to be told that the bounties were a myth, and that a duty to countervail a bounty was rank protection, contrary to the first principles of free trade. In this inquiry both these contentions have disappeared. Opponents still studiously ignore the bounties, but no one now dares to deny their existence. They may try to pick holes in the countervailing duty, or to raise difficulties as to its application, but every one seems to have given up the untenable theory that it is contrary to free trade. These are all great signs of progress. Opponents who find their champions defeated, and their means of resistance gradually disappearing, who begin to haggle as to minor details, or to have recourse to arguments and theories so grotesque as those of Sir Louis Mallet, are not far from coming to terms.

OBJECTIONS TO A COUNTERVAILING DUTY CONSIDERED.

(Continued from page 53.)

Having demonstrated that the imposition against sugar imported from a country granting a bounty on export, of such a duty as shall be the fiscal equivalent of the bounty, will not prevent the adjustment of prices taking place as if there were no bounties and no

duties, we have thereby proved that the countervailing duty cannot possess any element of protection. Those who assert the contrary, must be prepared to prove that, given a normal price level, free from the disturbing element of bounties, and supervening upon the elements adjusting that normal price level, ensue the bounty and the countervailing duty, prices will rise above that normal price level. Fully admitting, that any duty which adds to the free trade price level is a protective one, we leave our opponents to prove that the proposed countervailing duty will do this, and if they succeed, then they may rightly stigmatise such a duty as a protective one. Before closing our consideration of the economic objections to the proposed duty, we would remark, lest anyone should confound it with the differential duty objected to by the economists, that such last mentioned duty is contrary to the interests of the consumer, because it excludes superior competitors from our markets until prices rise above the level at which the competition of such superior producers would, but for the duty levied against them, have adjusted it. But competitors holding bounties thereby evidence their inferiority. In short, such a differential duty, as we have referred to, stands condemned, because it intercepts *natural* advantages which are the proper and essential elements for price adjustment under free trade. Whereas the countervailing duty intercepts a fiscal advantage, which is an improper and fallacious element in price adjustment.

We come now to the political objections to a countervailing duty. It is said that such a duty would be contrary to the "favoured nation clauses" in our treaties of commerce. We shall demonstrate that in the *presence* of bounties the *absence* of such a duty is a violation of the favoured nation clause. What is the favoured nation clause? It is clear that such a clause, when entered into by us with two or more countries, can only be in practice satisfied by the establishment of perfect fiscal equality at our hands, with respect to all imports of like character, from either the one or the other, or any of such countries with whom we have entered into treaty. For instance, Austria has obtained from us an engagement that her exports shall enter our ports upon terms as advantageous

as those granted by us to any other nation most favoured. France, also for instance, has obtained a similar engagement. Things equal to same thing are equal to one another. Austria must be equal to the "most favoured nation." France must be equal to the "most favoured nation." Therefore Austria must be equal to France at our ports. We satisfy, therefore, our engagement with both Austria and France when their goods are landed upon terms of fiscal equality: when we favour neither in competition on our—that is in their neutral—market. Suppose Austria disturbs this equality by fiscal aid operating on our market in favour of her exporters, which fiscal aid it is *within our power to neutralise*. In order to restore that condition of equality contemplated by the treaty, we refuse to suffer the operation of the disturbing element, and deal with it, and neutralise it by positive action. Thereupon Austria appeals to the treaty: thereupon we reply "the treaty is violated by your act, you cannot approbate and reprobate its principle by destroying in your own favour that equality which you accepted, and then by appeal to the treaty object to our act which restores to France that equality which she is willing to abide by." It is clear, that if Austria grants a bounty on exports to our market, and France grants none, fiscal equality is at an end in the competition between these two nations, unless we levy against Austria such a duty as shall be incident upon, and equal to, and so intercept the bounty. Failing this, France must either give a like bounty, or suffer inequality of fiscal condition on our market.

There is what is termed a practical difficulty, namely: that the bounties given by different countries vary in amount, and therefore our countervailing duties ought also to vary in amount, in other words, with a fastidious justice for every one except our own producer, we are bound to vary our duty to suit each nation which violates our free trade principles. But this practical objection must be overcome in a practical manner. Let a mean between the extreme bounties be taken, and one uniform duty corresponding to such mean be imposed. This would be a concession against the interests of the British sugar producers, because it would leave a margin of bounty still to be enjoyed by some foreign exporters.

To objecting nations, pleading that our duty was in excess of their bounty, our answer to them would be terribly unanswerable, namely: cease your bounties and you will meet with no duties, or, failing that, you will, as a wrong doer, have to raise your bounty to the mean amount of your bounty competitors?

If the House of Commons will enact, in accordance with the principle laid down in clause 19 of the Sugar Convention of 1864, a customs' duty, say of 2s. 4d. per cwt., upon all raw and refined sugar imported into this country from countries granting bounties on export, with power for Her Majesty by order in council to declare any country exempt from such duty, as and when its exports to our markets are divested of bounties, this great question will be settled in accordance with the strictest interpretation of free trade doctrines, and not British producers only, but their competitors from every foreign clime will find on British markets fiscal equality, and that true and real free trade competition which results in the "survival of the fittest," and secures to consumers the fullest play of all competing natural advantages. In conclusion, if the House of Commons refuses to enact this duty, such refusal must amount to a censure on Her Majesty's Government for having negotiated the abolition of bounties, since such abolition will take from our consumer as much as or more than the proposed countervailing duty, according as such duty is adjusted to the maximum or mean amount of the several bounties.

W. P. B. S.

THE ABOLITION OF SUGAR BOUNTIES.

PUBLIC MEETING IN DEMERARA.

A public meeting, convened by the Chairman of the British Guiana Planters' Association (Mr. A. J. Pitman) was held on 30th December last, in the Philharmonic Hall, for the purpose of affording Messrs. Peters and Monteith, delegates from the Workmen's National Association for the Abolition of Bounties paid by Foreign Governments to exporters of sugar, an opportunity of expressing their views on the subject of the sugar bounties.

The meeting was largely and influentially attended, several of the leading merchants and planters being present. Among those present may be noticed Mr. A. J. Pitman, (Chairman of the British Guiana Planters' Association,) the Hon. Robert Pate Drysdale, the Hon. Charles L. Bascom, the Hon. Josias Booker, Mr. Robert Smith, Mr. T. H. Glennie, Mr. R. J. Kelly, Mr. Edward Stephens, Mr. David Carruthers, Mr. D. C. Cameron, jun., Mr. Mewburn Garnett, Mr. Arthur Braud, Mr. F. A. Mason, Mr. R. P. Clarke, Mr. Risien, Mr. Edwin James, Mr. J. S. Hill, Mr. A. S. Folkard, Mr. Halliday, Mr. William Smith, Mr. Walter Bagot, Mr. William Craigen, Mr. C. L. Gilbert, Mr. Willcocks, Mr. T. F. Mordle, Captain Edwin McLeod, Mr. J. C. Whitehead, Mr. Carl Wieting, Mr. — Bascom, Mr. George Greig, Mr. Managan, Mr. Howell Jones, Mr. James Thomson, Mr. Nicholson, Mr. Christie, Mr. A. B. Trotter, Dr. Manget, Dr. Watkins, Dr. Williams, Mr. James Crosby, (Immigration Agent-General,) the Rev. Mr. Trotman, the Rev. Mr. Ketley, &c., &c.

The Delegates were warmly and cordially received.

Mr. PITMAN, who was in the chair, rose and said : Gentlemen, this meeting, as you are aware, has been called by the Planters' Association, notice of which has been given in both of our local papers ; therefore I suppose you will take the advertisement as read. As chairman of the British Guiana Planters' Association, I have the pleasure of introducing to you Messrs. Peters and Monteith, delegates from the Workmen's National Executive Committee for the suppression of the Foreign Export Sugar Bounties ; and inasmuch as the question at issue is one of grave importance to this community, I feel assured you will give them the welcome they deserve. They will point out for themselves the present position of the British sugar trade and the views of the body which they represent. I need only say that what is asked for is not that any unfair advantage should be afforded to British industry, whether in the colonies or at home, to the disadvantage of our foreign competitors, but that British industry, capital and energy should be relieved from having to compete with a system aptly described as bolstered up with subsidies, which, to quote the words

of Sir Louis Mallet, "were an international nuisance in 1863, and have been a growing evil until this day." The cause is being well fought at home, and if we are not apathetic, but heartily co-operate with our supporters across the water, we have good grounds for hoping that we shall eventually obtain redress. The present moment is a fitting one for action. France, Belgium, and Holland are anxious to enter into a fresh sugar Convention with England, and we as colonists should urge on the Imperial Government to take advantage of the opportunity thus offered and secure for our West Indian possessions what they have a right to expect —fair play. (Hear, hear, and applause.) Gentlemen, with these few remarks, I beg to introduce Mr. Peters to you.

MR. PETERS : Mr. Chairmen and gentlemen, my first duty to-day will be to very warmly thank you for the very kind manner in which you have treated us since our arrival in British Guiana, and for your efforts in placing every facility in our way relative to our mission. Now, sir, I think I cannot introduce the object of that mission better than by giving a short *résumé* of the British Workmen's movement for the abolition of all Foreign Sugar Bounties. The movement was inaugurated in Bristol in May, 1878, and the workmen in Bristol interested in the home and colonial sugar industry took the matter up very warmly. We held meetings in Bristol, passing resolutions condemning the bounty system and pledging ourselves to use our best endeavours for their abolition. A committee was formed to carry out the instructions of those meetings, and we immediately placed ourselves in communication with the other large centres of the sugar industry. This resulted in our holding a large conference of workmen, presided over by Samuel Morley, Esq., M.P. for Bristol, who at that meeting declared that the bounty system was a gross violation of all free-trade principles, and as a free trader he was prepared to support a countervailing duty so as to bring about a remedy for the system. Sir Stafford Northcote, Chancellor of the Exchequer, having consented to receive a deputation upon the subject, we accordingly waited upon the right hon. gentleman, and presented him with a memorial praying Her Majesty's Government, either by treaty

engagement or countervailing duty, to bring about an immediate suppression of the bounties. The deputation was introduced by Mr. Morley, Mr. Ritchie, Mr. Sampson Lloyd and Mr. Macdonald, all of whom pleaded our case well, Sir Stafford Northcote, in replying, said that his sympathies were entirely with us, and, that what we asked for was not in any way inimical to the principles of free trade. The workmen then resolved to send a deputation to M. Leon Say, Finance Minister of France, who consented to receive a deputation from Great Britain upon the question. We had an interview with M. Say, in Paris, who stated that he was desirous of removing the bounties, but remarked as to the great share of our trade the Austrians enjoyed through their high bounties or premiums, and that there was but little chance of the question being permanently settled, unless Austria agreed to abolish her bounties. Further correspondence with the French Government and the evidence of the French delegates before the British Parliamentary Committee leads to the fact that France, Holland, or Belgium will not alter their system unless assured that other bounty-giving Powers will do the same, or that Great Britain will impose a countervailing duty against their bounty-fed goods. We have held mass meetings in most of the large constituencies, and resolutions affirming the necessity of a countervailing duty have been unanimously carried. Our case is now being judged by a Select Committee of the House of Commons, and I feel assured from the evidence placed before that Committee that they will report in our favour. One of the last steps taken in our movement was the holding of another conference in London in August, at which a memorial was drafted and presented to Lord Beaconsfield and a deputation was appointed to visit these colonies to report to the people at home their capabilities for producing sugar and also to notice the effects of the bounties. We have now visited the French colonies of Guadeloupe and Martinique and the British islands of St. Lucia, Barbados and Trinidad, and now we are on the shores of British Guiana—a country which alone could supply the whole of Great Britain with sugar far better and cheaper than we can ever obtain it from Europe; and it only requires capital

and labour to more fully open the resources of this country. (Hear, and applause.) Just a few words upon the bounties. The bounties transfer the sources of production of sugar from the natural zone to the artificial; cause consumers to depend upon a precarious supply, and must, if the system is continued, end in a monopoly for the bounty-receiving competitors. It exacts the equivalent to the bounty out of the unsubsidized competitor or compels him to retire from the hopeless struggle: it has transferred the loaf sugar trade from London, Bristol, and other places to Paris, Amsterdam, and other continental dépôts; it has caused untold misery and privation to thousands of British workmen. The bounty acts in the same way with the unsubsidised competitor as if an actual duty was levied against his goods and the goods of the subsidised competitor admitted free; both systems lead to the same result. That the consumer has no right to the bounty, is testified by the efforts of both Governments to deprive him of it by diplomatic negotiations and by their willingness for the imposition of a countervailing duty. Every one concedes the desirability of putting a stop to these bounties, and when they concede that they concede everything. And then, what is the remedy for these bounties? After many years of remonstrances and fruitless negotiations, we propose the imposition of a countervailing duty against all bounty-giving Powers who will not come to a Convention and suppress them of their own accord. This, sir, would be no measure of protection, but would restore Free Trade competition, upon British Markets, to those competitors who have so long been denied it; and this is not contrary to the commercial policy of Great Britain. France, Holland, and Belgium have already signified their willingness to abolish the bounty system. It remains then for the other bounty-giving powers to be induced to do the same. Unto that end our several committees at home have pledged themselves to vigorously pursue the agitation until the next time of its coming again before the attention of the House of Commons, which must be early next session. With your co-operation we shall and must be successful; our cause is just and we have a good case, and Great Britain can no longer shirk the responsibility of settling this

question. Of our success, then, we feel certain, and thus by our united efforts we shall have succeeded in placing the sugar trade of the world upon a more sound basis—a measure which must be of incalculable benefit to the Home Trade, to the West Indies, and to British Guiana. (Applause).

The CHAIRMAN: The honourable Mr. Josias Booker will move the first resolution.

Mr. BOOKEE, said he was sure they had all good reason to thank the chairman for having given them an opportunity of receiving the Delegates, and of listening to the very interesting observations which Mr. Peters had favoured them with. They were very glad to see them (the Delegates,) and he, for one, was sure, that they would take back with them to the mother country a true knowledge and true impressions of what they had seen in this country, for they had gone about it, had seen what had been done and what was being done upon the estates, and the manner in which our people were treated. In fact, they had seen everything from first to last—the introduction of the immigrant, his treatment generally, his treatment particularly, in hospital, the way in which the estates were worked, the outlay on machinery and the cultivation of the soil—everything had been under their consideration; but putting aside for the moment the question of the sugar bounties, they had very great reason to rejoice in having the Delegates with them to-day. What we of this colony really wanted was, the removal of the false impressions that existed in England and elsewhere with regard to the place. Why, British Guiana was, even by persons who were supposed to know better, continually called an island! In the case of our present visitors, however, we would have the pleasure of bearing in mind that these gentlemen came from the hives of industry of Great Britain; they came to look and see for themselves, and they represented in England some seventy or eighty thousand men—or, he might say, an Association numbering as many—and when they came here they saw things for themselves, and when they should be able to go home again, they would be in a position to tell their fellow workmen truthfully what they had seen, and represent matters in their true light. They had not

come to look at things with any prejudice or party feeling, but with an honest desire to, as he had said before, see for themselves, and judge for themselves, justly and impartially. He thought the time had now arrived when we should make every effort in our power to get rid of the bounty system—and the sooner it was done the better. When Mr. Peters spoke about the manner in which he found the plantations here, he little knew of the enterprises that had been undertaken in years gone by, and even recently, in order to produce the satisfactory results which he had witnessed on coming here. There was the beautiful island of Barbados, for example; there was Jamaica, once happy and prosperous, but now so much fallen off in her prosperity; there was the fine island of Trinidad—which was only partly developed—all these, and many others, were sugar-growing places and were capable of yielding much more than they did now, under more favourable circumstances. We did not in any way or for one moment desire to check the production of beet-root sugar: we only required fair play, and no favour. (Hear.) Let us by every means in our power endeavour to obtain the abolition of this system, which was injurious to everybody, and we should be able to supply the world with a very large quantity of sugar. (Hear.) He now proposed the following resolution:—

Resolved: That this meeting most cordially welcomes to British Guiana the Delegates who have been selected by the various trades connected with the home and colonial sugar industry to visit the West Indies and this Colony, and report on their capabilities for supplying sugar to the English market.

The Hon. Mr. DRYSDALE seconded the resolution.

The resolution was carried unanimously.

Mr. ROBERT SMITH then moved the following resolution, in a long and forcible speech:—

Resolved: That this meeting is of opinion that the bounty system now in force on the Continent of Europe is a direct violation of free trade and economic principles, inasmuch as it causes prices to be ruled, not by the law of relative natural advantages, but by subsidies given by competing States.

Mr. MEWBURN GARNETT seconded the resolution, which was carried *nem. dis.*

Mr. KELLY moved the third resolution, which was as follows:—

Resolved: That this meeting would urge upon Her Majesty's Government to take immediate steps to do away with this injurious system, either by entering into a Convention with foreign Powers, whereby they agree to abolish bounties on the exportation of sugar, or otherwise by the imposition of a countervailing duty.

He said we had for years back heard of sugar Convention after sugar Convention—hopes had been raised that, when the time came for their coming into effect, the promised advantages would be forthcoming. But all ended in disappointment. We had still the bounty—supported sugars meeting us in the market. What was asked was, a countervailing duty that would meet the foreign producer when he arrived in the English market. This would not be any violation of the spirit of free trade.

The Hon. Mr. BASCOM seconded the motion, and said he entirely agreed with what Mr. Peters had stated to the meeting, and hoped that soon there would be a Convention which would abolish the injurious bounty system which now prevailed.

The resolution was carried unanimously.

The Hon. Mr. JOSIAS BOOKER said that before they separated, he would ask those present to bear in mind that they could not carry on matters of this kind without going to some expense. Messrs. Peters and Monteith appeared before them as working men, therefore he would call upon those present—and he was sure they would liberally respond to the call—to attach their names to the list which was lying on the table, in order to assist these two gentlemen who appeared before them to-day, in defraying their expenses. Perhaps he might add that Mr. Glennie would act as treasurer.

Mr. GLENNIE: With much pleasure.

Mr. PETERS: Sir, and gentlemen,—This movement has been fought and contested for two years, and it has been carried on mostly with the funds of our Association. Many eminent men at home have subscribed money, and others have given handsomely for renewing the agitation when we get home.

Mr. MONTEITH: I rise to propose a vote of thanks to the Chairman, and in doing so, I may state that since we have been here,

we have met with all possible kindness and courtesy, and I am sure that, when we return to England, our friends will take it as a very great compliment paid to them and to the Association to which they belong, and which we here represent to-day. In endeavouring to carry on the agitation for getting rid of this bounty system we have visited many places, and we have formed our opinion of them ; but this I may say, that since we have been out here, we have observed that the manner in which the coolies and other labourers are treated, as a rule, is not quite that which is generally described by the gentlemen of Exeter Hall—in fact, we find that they have not only been mistaken, but entirely in the wrong. (Hear, hear, and applause.) It was only the other day I witnessed the arrival of a coolie ship from India with immigrants, after a passage of eighty odd days, and when I looked at the condition of those men, women, and children, I saw at once the strongest evidence of the care, kindness, and attention which they receive during the period intervening between the leaving of their far-off homes and their arrival here—and, as I have said before, we have seen ourselves how well they are treated after having come here. (Hear, hear.) There were five hundred souls in that vessel, and there was only one death during the passage ; but to make up for that, they had two births, thus even giving one over. (Laughter.) From what we have seen on the estates, I can only say that the arrangements made upon them, both for the care and comfort of the immigrants and otherwise, reflect the greatest credit upon the country ; and when these matters are better known and understood at home—which I trust will soon be, from the explanation of them which we shall give when we get there—a great many false and erroneous impressions, which now exist in the minds of many, will be removed. (Applause.) I thank you, gentlemen, for the reception you have given us.

This terminated the proceedings.

DELEGATES' REPORT ON WEST INDIAN MISSION.—We understand that the full report of the Delegates as to their West Indian Mission is now in the press and will be published shortly.

THE WORKMEN'S WEST INDIAN MISSION.

RETURN HOME.

Great interest was manifested at Bristol upon the return of Messrs. Peters and Monteith from the West Indies, and a complimentary gathering to welcome the two delegates upon the successful accomplishment of the mission was held in that city on the 5th ult., at which about 70 representatives of various local trades were present. A letter from Mr. Wallwyn Poyer B. Shepheard, the Honorary Adviser to the Workmen's Committee, on Economic and Treaty Points, was read, wherein, after regretting his inability to accept the invitation to attend the meeting, he said: "He wished the Workmen's Committee success in their efforts to make the cause widely known, and to secure genuine and hearty support. The Committee had undertaken a great responsibility, of which, he doubted not, they would discharge themselves to the satisfaction of their numerous supporters. He felt sure that every step would be taken by Mr. Peters and the Committee to make all feel that they had not vainly trusted the Workmen's National Committee for the Abolition of Foreign Sugar Bounties." The letter concluded:—"The lines of your movement are now well-defined within limits admitting of no extension or restriction. The constituencies are your field of action, your power none other than that which right reason, and sound argument supply. Your work of agitation will be accomplished when the instincts of justice in the many are awakened in your favour; and, to my mind, signs are not wanting that the time is fast approaching for the bounty question to be brought to a complete and favourable settlement." Congratulatory speeches were delivered during the evening.—From *Bristol Mercury and Daily Post*.

SOUTHWARK ELECTION.—Mr. Clarke, the successful and Conservative candidate; Mr. Dunn, the Liberal candidate; and Mr. Shipton, the Radical candidate, all publicly declared their views in favour of meeting bounties by countervailing duties to Workmen's Committee.

ACTION OF BONE BLACK ON SOLUTIONS OF PURE SUGAR.

By P. CASAMAJOR.

In a paper published in the *American Chemist*, for November, 1871, "On the Purification of Sugar Solutions for the Optical Saccharometer," I gave an account of experiments made with dry bone black on sugar solutions. These experiments led me to differ from the conclusion to which Dr. Schiebler had arrived, that bone black absorbs sugar from its solutions, and that, therefore, the use of bone black, even when thoroughly dried, tends to give results with the saccharometer that are lower than they would be without the use of bone black.

My attention was called to this subject again during the latter part of 1878, by several communications of our regretted fellow-member, Professor J. M. Merrick, of Boston, to the *Chemical News*. In these communications Professor Merrick cites many authorities who agree in this: that the use of bone black, in tests by the optical saccharometer, tends to give results that are too low. In addition to citing these authorities, he gave experiments, made by himself, which confirm the opinions of the authorities cited by him. He found, in several cases that, when using bone black, the results were from 0·5 to 0·8 per cent. lower than they were previous to using bone black. Professor Merrick wrote to me at the time, calling my attention to these results, and I answered that, being very busy with other things just then, I had not time to go over the subject.

Since that time, during February of this year, I made some experiments to discover whether bone black really absorbed pure sugar from its solutions. In these experiments, I made use, in one case, of a solution of pure sugar, and, in another case, of a solution of good loaf sugar. The pure sugar was obtained by soaking good loaf sugar in alcohol for over twenty-four hours, washing the crystal with more alcohol, and, finally, drying the sugar over a water bath. The object of using pure sugar, or nearly pure, was to eliminate errors which might result from the unequal

absorption by bone black of the impurities that exist in commercial sugars. These impurities are of many kinds, but it generally happens, with sugar of high grade, that the impurities are in such a condition that they exert no action on polarized light, so that, on making the correction after inversion, the corrected result is almost always the same as the direct test, when we operate with sugars of 90 per cent. or over.

There being a possibility that the effect of bone black, in lowering the saccharometric degreee, was due principally to its power of removing dextro-gyrate impurities in greater quantity than the laevo-gyrate, the use of pure sugar would eliminate any error from this cause.

The experiments were conducted in such a way as to leave no doubt on the question whether bone black took up sugar from its solutions. A weight of bone black was used, which was many times greater than the weight of sugar that filtered over it.

First experiment.—This was made with 125 c.c. of recently and thoroughly dried new bone black. These 125 c.c. weighed 79 grms. The bone black was not washed to remove the salts.

The solution of pure sugar that was filtered over these 79 grms. of bone black had a specific gravity of $1\cdot052 = 12\cdot75^\circ$ Balling. In the optical saccharometer it stood at 51·5 per cent. These numbers give a coefficient of purity = 100. A volume equal to 80 c.c. was allowed to run out, the operation taking one hour. This portion that came through had a specific gravity of $1\cdot057 = 13\cdot05^\circ$ Balling. In the optical saccharometer it stood at 49 per cent. These numbers give a coefficient of purity equal to 92·8 per cent.

This fall in the coefficient of purity from 100 to 92·8 cannot be due to absorption of sugar, although the fall in the saccharometric indication from 51·5 to 49 per cent., shows that sugar has been removed from the solution. The decrease in the coefficient of purity can only come from the impurities present in new bone black, and points to the necessity of washing new bone black before passing sugar solutions over it.

As the quantity of bone black was very large in proportion to

the weight of sugar that filtered over it, the quantity of sugar removed from the solution may be taken as being very nearly the quantity which 79 grms. of new bone black can absorb. To ascertain this quantity of sugar, let us take 80 c.c. of the solution, such as it went on the bone black, its specific gravity being 1.052, the weight of the solution was $80 \times 1.052 = 84.16$ grms.

The degree Balling being 12.75, and the coefficient of purity being 100, the whole weight of sugar in the 84.16 grms. of solution was $0.8416 \times 12.75 = 10.73$ grms. of pure sugar.

The 80 c.c. of solution which filtered through the 79 grms. of bone black in the space of an hour, had a specific gravity of 1.057, which gives for the 80 c.c. of solution a weight of $80 \times 1.057 = 84.56$ grms. The degree Balling of these 84.56 grms. being 13.05, and the coefficient of purity 92.8, the quantity of pure sugar in the filtered 80 c.c. is $= 0.8456 \times 13.05 \times 0.925 = 10.25$ grms.

Subtracting this from the quantity of sugar previously obtained, we have $10.73 - 10.25 = 0.48$ grms. as the weight of sugar absorbed by 79 grms. of new bone black, which is equivalent to 0.606 grm., as the quantity of sugar absorbed by 100 grms. of new bone black.

Second experiment.—This experiment closely resembles the first. The bone black used was the ordinary bone black of the refinery. The quantity taken was 125 c.c., weighing 100 grms. The bone black was thoroughly dried, as in the first instance.

The solution of loaf sugar filtered over these 100 grms. of old bone black had a specific gravity of $1.051 = 11.5^\circ$ Balling. In the optical saccharometer it stood at 46 per cent. These numbers give a coefficient of purity equal to 99.5.

As in the previous case, a volume equal to 80 c.c. was allowed to run through the filter in the course of one hour.

The portion that came through had a specific gravity of $1.044 = 10.95^\circ$ Balling. In the optical saccharometer it stood at 43.3 per cent., which gives a coefficient of purity equal to 98.6.

We may notice here at once that the fall in the coefficient of purity is insignificant when compared to what happened with new bone black. Still it points to impurities absorbed by the old bone black.

If we go over the same calculations as in the first experiment, we find that the weight of the 80 c.c. of solution was $80 \times 1.051 = 84.08$ grms. The total number of grms. of sugar in 80 c.c. = $11.5 \times 0.8408 \times 0.996 = 9.63$ grms.

The 80 c.c., after filtering over 100 grms. of old bone black, weighed $80 \times 1.044 = 83.52$ grms., and the total weight of pure sugar in the filtered portion was: $10.95 \times 0.8352 \times 0.986 = 9.01$ grms.

If we subtract this quantity from 9.63, belonging to the 80 c.c., before going on the bone black, we have $9.63 - 9.01 = 0.62$ grm. as the weight of sugar absorbed by 100 grms. of old refinery black.

CONCLUSIONS.

These numbers: 0.606 grm. for the quantity of pure sugar absorbed by 100 grms. of new black, and 0.63 grm. for the quantity of pure sugar absorbed by 100 grms. of old black, are remarkably close, particularly if we consider the degree of approximation compatible with sugar analysis.

The quantity of sugar absorbed by 100 grms. of bone black may be put down as 0.6 grm. It is possible that new bone black may generally absorb slightly more or less sugar than the old, but this point can only be settled by a great number of tests.

To return to the action of bone black in sugar tests, there seems little doubt that, in many cases, the addition of bone black seems to lower the saccharometric test. This action must, in part, be due to the comparatively greater absorption of the dextro-gyrate impurities that are found in commercial sugar.

As to the absorbing action of bone black on sugar, if, as the above experiments show, this absorption is about 0.006 of the weight of the black employed, there must be no perceptible error in shaking a small quantity of fine bone black with the solution previous to filtration. A quantity of black equal to 4.5 grms., shaken with 100 c.c. of sugar solution, will almost always produce a marked improvement in the color of the solution. If this quantity of bone black absorbs 0.006 of its weight of sugar, this absorption will be equal to $0.006 \times 4.5 = 0.027$ grm. Now this quantity divided by 26.048 grms. (the quantity dissolved in 100 c.c. of solution) will give $\frac{0.027}{26.048}$ which is very approximately = 0.001, or

$\frac{1}{10}$ of 1 per cent., and this is the error which $4\frac{1}{2}$ grms. of bone black may produce from its property of absorbing pure sugar. By absorbing dextro-gyrate impurities a greater error may arise, but I regret to say that I have not tried to solve this problem, which is well worthy the attention of chemists.*

From a file of Australian newspapers, now to hand, we glean the following items :—

The Mackay Standard says :—"The import sugar duties in New South Wales, which are levied at £5 per ton, are most grievous to growers in Queensland, and, strange to say, the leading paper in Sydney has recently advocated the imposition of a similar tax on sugar grown in New South Wales."

The Queenslander tells "of the sugar season having been most favourable. From the cane districts, 4949 tons of sugar and 30,633 gallons of rum have been exported during the season."

An interesting experiment is being tried on the ground of the *Board of Enquiry*. The cane having been cut down and the tops burnt off, tobacco-water—an infusion of tobacco-leaf—is applied to test its effects on the cane mite, and the prevention of rust. In the most northern district cane grew 6ft. high and 7 inches in circumference in six months.

* Dr. Scheibler has called attention to the error, committed in saccharometric tests, by using basic acetate of lead. As the precipitate obtained, occupies a certain volume, this volume must be deducted from the 100 c.c. measured by the graduated flask. By using a volume of liquid smaller than 100 c.c., the result obtained is necessarily too high. This being the case, a sufficient quantity of bone black, shaken up with the solution, may act as a corrective by lowering the saccharometric degree. If there was any constancy in the effect of acetate of lead in raising the saccharometric degree, and of bone black in lowering the test, it would be possible to neutralize a certain volume of basic acetate by a corresponding weight of bone black. Unfortunately, if I am not mistaken, experiments are wanting to elucidate this subject.

ANNUAL STATEMENT OF THE SUGAR TRADE OF THE UNITED STATES.

At the commencement of the year under review the finances of the country were placed upon a comparatively sound basis, which had the effect of restoring confidence, and imparting courage to before timid capital ; dormant enterprise was awakened, and all the industries of the commonwealth were quickened.

To this favourable feature was added an unprecedented demand from Europe for food products, of which we have a great abundance to spare, resulting in an inflow of treasure from abroad wholly without a parallel. This influx of new capital imparted an extraordinary stimulus to business in all departments. Never before were the products of the soil, the loom, the forge, and the mine in such active demand. Consequently the artisan classes have been more fully employed and better compensated than in many years ; in fact labour skilled and unskilled has seldom, if ever, been in such urgent request.

This increased prosperity among the masses has been felt in no channel more distinctly than in this staple of which we treat, the vigorous consumption of 1879 being greatly aided as well by a lower range of prices than before current in many years, particularly during the first eight months of the year just closed. And this improved state of affairs has not been confined to this hemisphere ; fresh life seems to have been infused as well into other nationalities ; increased prosperity here has enabled us to greatly enlarge our purchases abroad and languishing foreign industries have been wonderfully stimulated thereby, so that the consumption of sugar in Europe has made a stride quite as advanced as it has done here. On neither side of the sea has the consumption of this article ever approached the figures touched last year.

By referring to the tables* preceding it will be seen that the imports of foreign sugar into the United States (exclusive of the states and territories on the pacific) for the year ending December 31, 1879, were 682,049 tons, against receipts in 1878, of 650,766 tons, an increase of 31,277 tons, and that the consumption of sugar

* We have not given these tables, the following figures being considered sufficient.

of foreign origin for 1879—deducting the exports of refined as well as raw—were 631,174 tons, against a consumption in 1878, of 613,896 tons, an increase of 17,278 tons. To these figures must be added the unusually full crop of domestic sugar, 112,000 tons, which brings the consumption of cane sugar proper for 1879, up to the large figures of 743,174 tons, against a consumption for 1878, of 684,896 tons, an increase of 58,278 tons or 8·50 per cent. The cane fields of most of the West India Islands, notably Cuba, yielded a more generous supply in 1879, than for the crop year preceding, and consequently there was an increased yield of molasses as well as sugar. The great bulk of this molasses finds its way to the markets of this country, and, with lower prices ruling for it than before in many years, and an active demand for its sugar product at fairly remunerative prices, a much larger quantity was consumed in this way last year than the year before. We are enabled to make a close estimate of the quantity so taken by the refining interests in 1879, at the five ports, Portland, Boston, New York, Philadelphia and Baltimore, and find that about 213,000 hhds., were boiled in 1879, with a yield of about 44,900 tons sugar, against 190,000 hhds., so consumed in 1878, yielding about 40,000 tons sugar.

Philadelphia distances all competitors in this branch of the trade, having consumed for this purpose nearly all her direct receipts and drawn on neighbouring markets to some extent. The consumption of molasses for refining into sugar at that port last year may be placed at 101,765 hhds.

We have no satisfactory data respecting the crop of maple sugar; for obvious reasons it is impossible to gather reliable statistics relative to this humble industry; estimates very widely ranging from 9,000 tons to 14,000 tons. It is evident, however, that the yield of the tree is gradually lessening, and the time is not far distant when this description of sugar will be but a tradition. Probably 10,000 tons will fully cover the yield of 1879.

The manufacture of sugar from the best roots receives increased and well-deserved attention. We learn that the enterprise inaugurated a year or two ago at Portland makes satisfactory

progress, the works there having turned out the past year 900 tons of excellent sugar. Farmers, as a class, are slow to enter into new paths, and the great difficulty that impedes to some extent this new industry is to prevail upon landed proprietors to plant their estates with this crop. On the Pacific coast the culture of the beet for conversion into sugar makes some progress, and the yield of the root last year was nearly double that of 1878. At the same time it was small, not much more than one-third the amount turned out by the Portland refinery, which has only been in operation about two years.

The crop of Louisiana for 1878-79 was much larger than any previous crop made since the civil war, exceeding even the estimates made at this time last year. Mr. A. Bouchereau, of New Orleans, in his valuable annual statistical volume treating of the leading products of that state, makes the yield for 1878-79, 213,221 hds., against a yield of 127,753 hds. the preceding crop year.

The crop now being made has proved disappointing; grinding is now pretty well over, and a close estimate can be made as to the result. Early in the season the promise was flattering for a crop exceeding that of 1878, but the severe storms which swept over the state last September prostrated and injured the cane throughout a wide section of the sugar parishes, and subsequent unusual warm weather retarded the ripening of it, thus materially reducing the yield. The most conservative authorities do not estimate the crop beyond 185 @ 190,000 hds., while there are others who stoutly maintain that the yield will not exceed 175,000 hds.

A new and important feature in the present crop is the largely increased production of clarified and centrifugal sugar, and a corresponding decrease in open kettle, or old process, sugar. It is generally estimated that the production of the latter will be proportionately about 15,000 hds. less than last year, and the make of clarified and centrifugal sugar be correspondingly increased. Planters have hurried their produce to market to take advantage of favourable prices and to liquidate pressing obligations incurred

by the September tornado, so that the receipts at New Orleans are something larger, notwithstanding a smaller crop, than they were up to a parallel period last year. The New Orleans *Price Current* makes the receipts from the commencement of the season to 6th inst. equal to 89,262 hhd. against receipts same time last season of 83,519 hhd. The stock under sheds 1st inst. was 6,984 hhd., against a stock of 5,974 hhd. January 1, 1879.

The consumption of raw sugar in the States on the Pacific last year was smaller than that of 1878. The receipts at San Francisco from the Hawaiian Islands were much larger in 1879 than ever before, while from all other sources of supply there was a large falling off.

The following statement from the San Francisco *Merchant* shows the import and deliveries of sugar for consumption at San Francisco for the year ending December 31:—

Received from—	1879. lbs.	1878. lbs.
Hawaiian Islands	46,682,801 ..	36,919,576
Manilla	2,848,822 ..	40,645,221
Java	2,619,303 ..	6,460,602
Central America	1,457,756 ..	4,843,350
Peru	None. ..	1,395,935
China	861,112 ..	1,586,888
Calcutta	None. ..	335,882
Domestic beet sugar, estimated	800,000 ..	500,000
Total	55,269,794 ..	92,687,404
Stock, January 1	17,707,295 ..	1,304,245
Total supply	72,977,089 ..	93,991,649
Stock, December 31	1,245,739 ..	17,707,295
Consumption	71,731,350 ..	76,284,354

The foregoing examination of the sources of supply justify us in summing up the consumption of raw sugar in the United States for the year ending December 31, 1879, and comparing it with the consumption of the previous year, as follows:—

	1879. Tons.	1878. Tons.
Cane sugar consumed in the United States on the Atlantic	743,174 ..	684,896
In the States and Territories on the Pacific	32,022 ..	35,976
Of sugar made from molasses ..	44,900 ..	40,000
Of maple sugar	10,000 ..	11,000
Of domestic beet-root, sorgo, &c.	1,800 ..	1,600
Total..	831,896 ..	773,472

Increase in 1879..... 58,424, or 7·55 per cent.

Having reviewed the trade of the country as a whole, we now refer more particularly to the movement of the staple at this port. It will be seen by the statistics relative to New York, that the importation and consumption of this article in 1879 was larger than for any previous year in the history of the trade; and, upon the whole, the season was one attended with more satisfactory results, both to the importing and refining interests, than its several immediate predecessors. Considering direct importations of foreign sugars only, 70·45 per cent. of the whole receipts in the United States in 1879 were laid down in this port, against 70·60 per cent. in 1878, and 69·15 per cent. in 1877.

* The imports at Boston and at Philadelphia were much larger last year than the year before, and at Portland there was an increase, while there was a large falling off at Baltimore, owing to a great reduction in their refining operations; and the receipts in New Orleans were much smaller in 1879 than in 1878; there was a decrease also at the other Southern ports as well as at the Eastern ports, taken as a whole, aside from Boston and Portland.

A reference to the preceding tables will show that the receipts of foreign and domestic sugar at this port in 1879 were 505,685 tons, against 474,074 tons in 1878, while the deliveries for consumption and to supply the wants of the neighbouring cities, exclusive of shipments of refined sugar to foreign countries, were 455,473 tons in 1879, against 442,910 tons in 1878, an increase of 12,563 tons, or 2·83 per cent. The stock at the close of the year

was 46,635 tons, against a stock December 31st, 1878, of 27,867 tons, an increase of 18,768 tons. This large comparative excess of stock was due in part to the stagnation in the trade during a portion of November and December, and in part to the unusual diversion of sugar destined for foreign countries to this port, supplies being attracted hither by the large advance made in the article in October and the early part of the succeeding month.

Comparing the imports here for 1879 and those of 1878, we find an increase from Cuba, Demerara, Barbados, the French Islands, other West Indies and Mexico, the Philipine Islands, Java, other East Indies and Europe; while there is a falling off in the receipts from Trinidad, Jamaica, and other British West Indies, and a large decrease in the imports from Brazil. From China we received none last year, against 1397 tons in 1878. The following statement shows the

DELIVERIES OF FOREIGN AND DOMESTIC SUGAR AT THIS PORT FOR
THE PAST TWENTY-EIGHT YEARS.

	Tons.		Tons.
1879	455,473	1865	213,568
1878	442,910	1864	142,047
1877	425,732	1863	195,164
1876	412,208	1862	219,330
1875	405,338	1861	183,855
1874	433,155	1860	213,325
1873	356,110	1859	190,135
1872	331,025	1858	185,801
1871	323,785	1857	147,811
1870	267,265	1856	171,611
1869	254,579	1855	159,320
1868	240,555	1854	148,028
1867	220,487	1853	150,880
1866	227,134	1852	144,439

With respect to values there were but slight fluctuations during the first nine months of the year. January opened with Cuba fair refining worth 6½ cents, and the lowest point was reached in April when the quotation declined to 6½. From this, however, there

was a gradual gain until September when the same grade was quoted 6 $\frac{1}{2}$. During October a more decided improvement was developed, and under the excitement which prevailed during the early part of November, the value advanced to 8 $\frac{1}{2}$ cents, which was maintained until the beginning of December, when the price receded to 7 $\frac{1}{2}$ cents, which was the closing price at the termination of the year. The average value of Cuba fair to good refining for the year, as compared with that of 1878 is 32 cents per 100 lbs. lower than last year, Havana White 27 cents., Havana Brown 43, Manilla 40, and Brazil 32. Notwithstanding the sharp advance experienced during the month of November, prices did not reach the maximum attained during the year 1878. The average price of fair to good refining Cuba sugar was lower last year than before since 1861.

The following statement shows the yearly average price in currency of fair to good refining Cuba sugar for each of the past thirty years:—

1879	\$6.93	1864	\$17.22
1878	7.25	1863	10.77
1877	8.89	1862	7.92
1876	8.48	1861	5.95
1875	7.97	1860	6.88
1874	7.98	1859	6.64
1873	8.05	1858	6.60
1872	9.03	1857	8.69
1871	9.33	1856	8.02
1870	9.74	1855	6.04
1869	11.64	1854	4.83
1868	11.32	1853	4.96
1867	11.11	1852	4.91
1866	11.03	1851	5.45
1865	13.84	1850	5.54

The exports of refined sugar for 1879 exceeded those of 1878 by 7,942 tons. The increased shipments were all over-sea exports, Canada having taken 1,236 tons less last year than the year before, the new tariff of the Dominion having checked purchases in the markets of the United States.

In entering upon a new campaign, in view of the fact that the European beet sugar crop of 1879-80 will be much smaller than that made the two previous crop years, unusual interest attaches to the probable supply of cane sugar for the current year. As has been our custom, we have communicated with the most reliable and conservative authorities in the cane growing countries, and have elicited the following information. We may add, however, that forecasting crops before they are harvested is, at the best, hazardous. Throughout the West Indies grinding has only fairly commenced, and some five months must elapse before the crop in the islands will be finished. Meantime atmospheric and other influences may alter very materially the present prospects. Whatever may occur, however, will probably be rather toward lower than to higher figures.

As Cuba supplies from 70 to 75 per cent of our consumption of foreign sugar, the extent of the yield of that island is of the first importance. The crop of 1879 was much larger than for many previous years, having been about 660,000 tons; deducting 30,000 tons for the consumption of the island, leaves 630,000 tons for shipment, against in 1878 a crop of 530,598 tons, in 1877 460,568 tons, in 1876 537,748 tons, and in 1875 617,656 tons. In the early part of the present season a crop of 700,000 tons was confidently predicted, but latterly the estimates have been largely and steadily shrinking, and now the most conservative authorities do not pitch the figures higher than 600,000 tons, while some close observers do not look for a yield beyond 550,000 tons, or about 525,000 tons for export. The stock at Havana and Matanzas 1st inst. was 10,312 tons, against a stock of 18,899 tons January 1, 1879.

Porto Rico made in 1879 a crop of about 90,000 to 95,000 tons, against a crop in 1878 of 74,000 tons. The cane fields, at last mail advices, presented a favourable appearance, and a yield about equal to, but not in excess of, that of last year is expected.

The crop of Martinique and Guadaloupe in 1879 was about 200,000 hds.; in consequence of an excessive rain fall the cane has been injured and grinding has been delayed; there will be a

deficiency in the crop of 1880 variously estimated at from 10 to 20 per cent.

The latest advices from Barbados state that the weather was very favourable for the cane, and the prospects were good for a crop something larger than that made in 1879, which was about 45,000 hhds.; a yield of 50,000 hhds. for this year is probable.

Our correspondent advises us that the crop of Trinidad Island for 1880, will be at least 5,000 tons less than that made in 1879, which was about 65,000 hhds.

The islands of Jamaica, St. Croix and St. Domingo, as a whole, will make this year about the same quantity as they made in 1879.

The yield of the lesser Antilles, considered separately, is comparatively unimportant, but when grouped, their aggregate production is by no means inconsiderable. St. Kitts made in 1879 13,000 hhds., only 830 of which was shipped to the United States. The crop prospects for the present year are very satisfactory, and the general opinion among planters is that the yield for 1880 will not be less than 14 to 15,000 hhds. Antigua made a crop in 1879 of 12,000 hhds.; the present crop is well advanced, and grinding is about commencing, with the expectation of a better yield than last year, say 15,000 hhds. St. Lucia will produce about the same this year as last—10,000 hhds. Dominica yielded, in 1879, 4767 hhds., and this year about the same quantity will be made. Nevis made about 4000 hhds. in 1879, and there will be little, if any, increase on that amount this year. The yield of Grenada in 1879 was 2400 hhds.; present prospects very unsatisfactory, and a crop of not over 1500 to 1800 hhds. is expected. St. Vincent made 10,000 hhds. in 1879, and this year a yield of 12,000 hhds. is looked for.

The crop of British Guiana last year was much larger than that made in 1878; the exports from Demerara for the past season were about 69,000 tons. Until recently, the weather had been drier than the planters liked, but at last advices copious rains were falling, and the prospect for the yield of 1880 was good for a crop quite equal to that made in 1879, with the probabilities not unfavourable for some excess over the figures then reached.

The Brazil crop, for export, for the crop-year of 1878-79 was about 190 to 200,000 tons, and the crop now being marketed promises an equal yield. Supplies are coming in freely to the shipping ports, and are larger than up to the same time last year. This is owing to planters hurrying forward their produce to take advantage of the favourable prices that ruled at the ports in October and November.

In consequence of the war still in progress, Peru will make this year a small crop. From Mexico and the central American States we have no reliable advices, but their supply for 1880 will probably not vary to any considerable extent from that exported in 1879.

Directing our attention now to the cane growing countries in the Eastern seas, we find that the crop of the Philipine Islands for 1879 did not fulfil its early promise. The exports from all ports from January 1 to November 8, 1879, the crop at the latter date being about all forward, were 97,815 tons, against a total for 1878 of 106,571 tons, and 114,093 tons for 1877. The prospect for the crop now about commenced is, so far, favourable for an increase on the yield of 1879, the excess being estimated at 12 to 15,000 tons. From China and British India we have nothing reliable; we received no sugar from either of these countries during the year just closed.

Java made a crop, season of 1878-79, of 205,000 tons; the present yield, it is authoritatively stated, will not exceed 200,000 tons, or 50,000 tons less than we expected earlier in the season, the yield having been adversely affected by an excessive rain-fall and very unfavourable weather generally.

Mauritius and Reunion send gloomy accounts respecting the crop now in progress. In addition to adverse weather, a fatal cattle disease had swept the two islands, greatly crippling the planters in getting their cane to the mills, so that the estimates for the two islands are down to 90,000 to 95,000 tons, against a crop of 166,000 tons season of 1878-79.

Having reviewed the prospect for the supply promised by the most prominent cane growing countries for the campaign now opening, there remains but to consider that very important crop, the

European beet-root yield for 1879-80. The yield of this plant for the crop-year of 1878-79 was very large, having been 1,574,153 tons, against a yield of 1,420,827 tons season of 1877-78, and 1,101,141 tons season of 1876-77. The unfavourable summer and fall of 1879 curtailed nearly all the products of the soil throughout the continent of Europe, and the beet crop did not escape the general disaster. The most cautious authorities estimate the present crop at 1,365,000 tons, or a deficit of about 210,000 tons, as compared with the previous crop. But there are other careful observers who take even a less favourable view of the prospect, and place the deficiency at the somewhat startling figures of from 260,000 to 280,000 tons.

The consumption of cane and beet sugar for all Europe, for the year ending November 1, was:—

	1879.	1878.	1877.	1876.	1875.
Tons.....	1,815,438	1,723,401	1,581,727	1,632,932	1,527,924
Stock in all Europe					

November 1.... 301,968 281,864 287,973 240,672 305,199

The sum of these figures shows that the consumption of Europe and the United States together, for the year just ended, was about 150,000 tons larger than the quantity taken in 1878, and that the stock in Europe and in this country together at the close of the year was about 364,000 tons, or about 30,000 tons larger than that remaining at the close of 1878. Taking the most conservative view, the present prospect then points to a net deficiency in cane sugar for the present campaign as compared with the previous one of 150,000 to 160,000 tons, and of beet sugar of 200,000 tons, together a total deficit in the supply of cane and beet of 350,000 to 360,000 tons.

Overlooking the field from a purely statistical standpoint, and considering the largely increasing consumption of the two hemispheres, it is not a strained inference that concludes that the average price of sugar in the markets of the world will be higher for 1880 than it was in 1879.—From the *New York Commercial and Shipping List*.

CROWN FUEL.—We are glad to notice that the Crown Preserved Coal Company have secured orders from the English Admiralty, for a considerable quantity of fuel to be despatched to their stations at Bermuda, Jamaica, and Barbadoes. This Company's manufacture has been long and favourably known in many of the West Indian Islands, and Demerara in particular.

LIVERPOOL ELECTION.—It appears from reports in the local papers that both Mr. Whitley and Lord Ramsay were interviewed by delegates from the Workmen's Committee on the sugar question, and satisfactory assurances elicited. Lord Sandon was also interviewed on the bounty question.

Correspondence.

GILL'S PROCESS, AND HOW IT WAS CONTRADICTED.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

There is in the January number of your magazine a report on the trial of my process for clarifying cane juice, made in Demerara, which report appeared originally in their local newspaper, as was duly acknowledged. This report professed to relate the operations during two days, in the presence of three gentlemen who are well known for their experience in the manufacture of sugar. Now a third day is added, in whispers, which contradict the work of the preceding two days. Two of those gentlemen refuse to sanction the report, and were also absent on the third day. I apprehend that such a complication deserves explanation, to which I desire to address myself, with your permission.

It was Mr. Bellairs who took the active part in the conduct of this experiment. Being aware that Mr. Bellairs is at least a sceptic as to the value of my process, I succeeded in obtaining the presence of Mr. Stephenson, who is the owner and manager of that extensive estate, Goedverwagting; and also Mr. Charles Williams, who is the chemist on Plantation Bel Air.

On the second day my process was carried out into practice in its integrity, and Mr. Bellairs' report tells us that the cane juice expressed that day "was not limed." In a word, this is a fact of superior importance to the success of my process. The sugar which was produced that day, as we know, was submitted to the opinion of one of the first grocery houses here in London, who pronounced "The sample of Demerara crystals is a fine grocery sugar, and is "worth 31 shillings for us to pay in the market at the present "moment."

I have reason to believe that Messrs. Stephenson and Williams, being satisfied with such a result, left Mr. Bellairs uncontrolled by their presence. Possibly they had no prejudices of their own to explain away. The simple fact of those ten hogsheads and more of "Demerara crystals," made in that day and a half, told its own tale in a language which all understand. The recognition of facts may be a lowly and sometimes an unpleasant function; but it saves us from many blunders, and is, moreover, a part of the homage we owe to truth.

It appears to be highly probable that Mr. Bellairs, seeing how very far such results were from his predictions, had to get any report so constructed as not to disprove his prophesies too pointedly; therefore he constructed a report himself, which the other two gentlemen reject, as I confidently expected, and expressed in my "remarks." He could have had the signatures of the other gentlemen for the asking, but not to an untruth.

This brings us to the third day's trial, the details of which, being highly interesting, deserve to be noticed here *in extenso*.

Mr. Bellairs now felt free to realise his confident assertion that my process "is capable of being modified and converted into a "valuable system of sugar manufacture, possessing as it does un- "mistakable elements of success."

On this third day this "valuable system" came out in all its perfection; when was continued so many as the author of this "valuable system" thought proper of those "unmistakable elements of success" which his keen eye discovered in my process,

and his superior discretion recorded in his report. This master mind shines now in all the brilliancy of originality, illuminating the path to a new, a "valuable system." Fortunately we are spared the trouble of a lengthened story when a few words can tell the tale of the secret, that Mr. Bellairs added to those "unmistakable "elements of success" which belonged to my process, as if—I repeat the words—as if intentionally to counteract that success, he added the old, worn out treatment of *lime and the sulphur-box*. The result of Mr. Bellairs' "valuable system," he himself tells, was "a sort "of sling, like bird-lime." "Alas, what a falling off "was there, Horatio!" But supposing that this "sling" was his aim, he could scarcely have succeeded in a better manner. Take his own words for the details. Thus:—

"I limed the syrup, copper-wall, and, *in fact, the juice in all its stages*, and have made some sugar, but it is a nasty, dirty, grey, "sticky mess, most difficult to cure. I was obliged to introduce "nine buckets of strong cream of lime" [say 40lbs. of crude lime] "into the pan before I could get any granulations at all. What is "the reason of this failure? I don't know."*

* The explanation is easy where the function of lime is understood. I have often stated it, and repeated it in my "remarks," thus:—

"It were well if lime in cane-juice did no more than correct acidity. Lime "also dissolves those well-known impurities which are in cane-juice to accu- "mulate, entangle, combine with, and rob the planter of almost as much "sugar as he sells. It must be but a poor consolation to gain molasses at "the expense of sugar."

It may be the easier to understand when I apply this "remark" to the subject before us. My process is intended to coagulate and throw down the impurities in the tank. It is the function of the added lime to dissolve and hold those impurities suspended in the liquor, to pass on with it, to be boiled together and here produce the "sling" which puzzled Mr. Bellairs. I make no attempt to correct the natural acidity of the cane-juice, but where undue acidity occurs from sour canes or neglect, I add sufficient lime to produce the rose-tint on litmus-paper, but *not before the syrup is perfectly free from impurity*. Mr. Bellairs remains at liberty to sow his lime again with indiscriminate zeal on "*the juice in all its stages*" of manufacture, to reap the inevitable molasses, or, the birdlime like sling. Gross ignorance would claim a similar attribute for my process, and poor credulity stands by with open mouth to swallow the unmitigated falsehood.

The fine bit of candour which we have in the two or three last words would almost redeem the silly blundering. But—

The astounding fact remains to be told, for no ingenuous mind could guess that Mr. Bellairs has the reckless hardihood to attribute this miserable result of his "valuable system" to my process. He therefore pronounces his *unbiased* judgment (?) thus:—"Mr. Gill's process is perfectly useless." Can there be anything more despicable than the mode of arriving at such a climax?

That man must have "eaten shame and drank after it." He must know—if he knows anything of my process—that *I am anxious to avoid the use of lime in cane-juice*. In spite of that oft-told tale, *he limes the juice in all its stages*, in direct antagonism to my process, and opposed to the second day's teaching of his own experiment, when he got those fine crystals of sugar which so much astonished him. Now he crams the juice with lime to evoke a "valuable system" for "birdlime," not sugar. He most assuredly deserves a reward, such as every honest man can bestow.

Yours faithfully,

W. EATHORNE GILL.

P.S.—It is a significant fact that although the drainage from the centrifugals remained in the casks, no attempt has been made to utilise it to produce the several hogsheads of sugar which it contained more than is usually obtained from a similar quantity and quality of cane-juice, the drainage being now free from molasses. A man having a desire to consult the interests of a generous employer would not allow such an opportunity to pass without some attempt to decide its value. Or, it may not be "convenient" to announce its value.

Analytical Laboratory,

79, Mark Lane, E.C., Feb. 5th, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

I have just read your notice of my official report on Ceylon soils, published in the February number of the *Sugar Cane*.

You seem to doubt the possibility of manganese being present in

some Queensland sugars in sufficient quantity to affect the colour.

Allow me to refer you to the following paragraph, taken from a "Report of the Sugar Cane Disease in the Mary River district, Queensland," by Professor Liversidge, of the Sydney University:—
"A strange fact in nearly all the above analyses is the very large proportion of manganese which they show. Ash No. 6 contains an extraordinary amount, namely, 7·63 per cent. manganese protoxide, and as it is present in larger proportion in the *ashes* of the *healthy* canes than in those from the diseased, there is no reason to suppose that it exerts a pernicious influence upon the cane. I have been informed that occasionally the sugar manufactured in the Mary district had a green tinge; this was in all probability due to the *presence of manganese*."

Again, as regards the excess of magnesia over lime. I am fully aware of Dr. Phipson's views on this point, having read his interesting pamphlet on sugar cane soils previous to my visit to Ceylon. But I do not agree with the conclusions he draws therefrom, and could produce several analyses of soils showing an excess of magnesia which are nevertheless productive soils—for coffee at least. No doubt soils that have been exhausted by long cropping without manure show a deficiency of lime to a greater extent than they do of magnesia. But an excess of magnesia is frequently found in newly opened estates, and is due rather to the natural geological composition of the *debris* from which the soil has been formed, than to the effect of continuous cropping. I fear other constituents besides lime require to be added in order to make an improvement in naturally poor soils.

Lastly, you remark that as the percentage of water is less than 2 %, in a soil upon which coffee was dying, it would be unnecessary to look for any further reason. You forget that the analysis was made in a partially dried sample and not in the soil in its natural state. Ceylon planters complain of the excess of rain, not a deficiency. Wind, wash, and retentive, stiff soils have ruined no end of estates. Coffee likes a friable, loose soil, not a stiff, damp one.

Yours faithfully,

JOHN HUGHES.

THE SELECT COMMITTEE ON THE BRITISH SUGAR INDUSTRIES.

W. P. B. S. addressing the *Morning Post*, writes:—

What has become of the Select Committee on the British sugar industries? There are no signs as yet of the resumption of their important duties. And yet I read in files of West Indian papers that Her Majesty's subjects in the West Indies and British Guiana are hopefully reliant upon justice being done them by the Imperial Parliament this session. Some English workmen, just returned from a visit to the West Indies, are telling their trade societies who sent them out, of sights which should not be seen, and but for bounties to beet sugar would not be seen there; of thousands of English tropical acres lying uncultivated; of fine machinery overgrown with the vegetation of abandoned estates; of urgent appeals by our colonists to Sir Michael Hicks Beach, and to Parliament, not for protection either open or disguised, but for free trade pure and simple for themselves and all other competitors in British markets; and Lord Salisbury informs the workmen's committee that last year Austria paid 12,000,000fl. in drawbacks on exports of their beet sugar. This is not a mere question of trade or of refining, but one also which relates to our very sources of production. But what has happened to the Select Committee appointed to right a grievous wrong?

February 15th, 1880.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

479. THOMAS JAMES SMITH, of the firm of Robertson, Brooman & Co., of 168, Fleet Street, London. *Improved apparatus for effecting continuously by the diffusing process, the extraction of the juices from beetroots, sugar canes, dye-woods, and all extractive matters generally.* (A communication from Emile Charles, and Alfred Perret, of Royle, department of the Somme, France.)

572. HERBERT JOHN ALLISON, of the firm of Allison Brothers, of 41, Southampton Buildings, Holborn, Middlesex. *An improved apparatus for the maceration or steeping of beetroot in the manufacture of sugar.* (A communication from Sylvère Lobry, of Paris, France.)

742. JOHN GARRETT TONGUE, of the firm of Tongue and Birkbeck, of 34, Southampton Buildings, Middlesex. *Improved means and apparatus for cleansing the discharge water from sugar manufactories and other industrial establishments.* (A communication from William Knauer, of Osmünde, near Groebers, Prussia.)

2488. ANDREW STEWART, of the Cartsburn Sugar Refining Company, Greenock, in the County of Renfrew, North Britain. *Improvements in the modes and means of washing charcoal filters, and in fittings connected therewith.* The inventor reverses the ordinary washing process and admits the warm water, or the water and steam, at the bottom of the column of charcoal, thus forcing and floating off the clogging up and bad colouring matters upwards in the reverse direction to that in which they were deposited. To effect this, suitable pipes lead from the boiler, or other pressure vessel, into the bottom chamber of the filter below a perforated false bottom which supports the charcoal, drawing-off pipes being fitted to the top of the filter. (This invention received provisional protection only.)

2550. ANDREW STEWART, Sugar refiner, and JOHN HOUSTON, Engineer, both of Greenock, Renfrew, North Britain. *Improvements in packing sugar into casks, and in machinery or apparatus connected therewith.* The novelty of this invention consists in securing the cask vertically, with its close bottom on a rocking beam or frame of a machine, so as to give it a rocking and knocking motion whilst it is being filled, thus making the mass of sugar more compact. The rocking beam swivels in suitable trunnion bearings, one trunnion being provided with an adjustable differential acting lever, worked by a connecting from a crank, or any prime moving revolving shaft. The cask is held on this frame by segmental gripping slides forced towards each other by a screw or screws: these slides may have a roughened edge to grip the cask. The oscillating beam is suddenly stopped by coming against a fixed projection thus imparting a jolting motion to the cask at each oscillation of the frame or beam. (This invention received provisional protection only.)

3971. PETER CALLIBURCES, of Rue Telegraphe, Pera, Turkey. *Improved means and apparatus for concentrating liquids by evaporation.* In carrying out this invention, heated air is forced by pumps through a small slit or opening into an evaporating chamber. This chamber contains a receptacle for the sugar juice, or other fluid placed just beneath the small opening above mentioned, and beneath this opening is fixed a series of diaphragms placed vertically, partly parallel to the side in which the opening is formed, and partly at right angles thereto, and not less than $\frac{1}{8}$ th of an inch apart. These

diaphragms dip into the fluid in the receptacle, and as the air is forced violently through the narrow opening just above, it draws up some of the fluid through the series of diaphragms and carries it in the form of spray into the evaporator. The spray falls on to the bottom of the evaporator, which is heated by a steam coil beneath, and as the bottom of the evaporator slopes down to the side of the receptacle the fluid flows back thereto, each time more dense, until the whole is either pasty or crystallized as may be required. Hot air blown into the evaporator by a fan serves still further to evaporate the spray. The vapours pass off through suitable pipes at the top of the evaporating chamber.

AUSTRIAN.

(Patents granted during September, 1879.)

- 2754. A. L. G. DEHNE, of Halle-on-the-Saale. *Composition filter-plates.*
- 2755. A. L. G. DEHNE, of Halle-on-the-Saale. *A filter press.*
- 2833. J. KORAN, of Kwassitz. *A disc cutter for setting the Königsfeld diffusion beet-cutters.*
- 2895. A. PLEFKA, of Ungarisch-Hradisch. *A compound beet-knife for diffusion cuttings, with an undulated or square edge.*
- 2909. A. V. RITTER-ZANG, of Skrivan. *Replenishing or feeding beet-diffusers without disturbing the circulation of beet-juice.*

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To FEB. 14TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS. 1880.	1879.	IMPORTS. 1880.	1879.	DELIVERIES. 1880.	1879.
London	74 ..	42	41 ..	27	41 ..	30
Liverpool ..	42 ..	41	25 ..	44	27 ..	27
Bristol	2 ..	5	4 ..	8	5 ..	6
Clyde	24 ..	35	20 ..	32	29 ..	29
Total ..	142	123	90	111	102	92
Increase..	19		Decrease..	21	Increase..	10

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
31ST DEC., FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepts.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
154	184	25	96	2	461	439	468

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
31ST DEC., IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepts.	TOTAL 1879.	TOTAL 1878.	TOTAL 1877.
957	306	31	295	183	1772	1773	1572

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	280,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	385,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland ..	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	55,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,380,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

In the early part of the past month there was again a decline in the sugar market; towards the middle there was more confidence shown, and prices recovered a little. During the latter part of the month larger quantities of raw sugar were offered for sale than for some time past, and refiners and grocers bought freely at first, but towards the close with less spirit, prices ruling in their favour.

The imports in 1880, compared with those of 1879, show a decrease of 21,000 tons, against a decrease of 3,800 tons shown last month. The deliveries, which last month showed an increase of 3,800 tons, now exceed those of last year by 9,100 tons.

The stocks of sugar on the 14th February were 18,900 tons in excess of those of the same date last year, and 10,000 tons less than on the 1st January, 1880.

Beet is offering at lower prices. The last transactions in Austrian have been at 22s. 9d. to 23s. per cwt. f.o.b. for 88 per cent.

French loaves are quoted at 1s. 6d. to 1s. 9d. lower.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 23s. to 23s. 6d., against 24s. to 24s. 6d.; good to fine grocery, 25s. 6d. to 27s. 6d., against 26s. to 27s. 6d.; Martinique crystals, 27s. 6d. to 28s. 6d., against 29s. to 30s.; No. 12 Havana, 24s. 6d. to 26s., against 26s. to 26s. 6d.; fair to good refining Cuba Muscovados, 23s. to 23s. 6d., against 24s. to 24s. 6d.; middling to good brown Bahia, 20s. to 21s., against 20s. 6d. to 21s. 6d.; good to fine Pernambuco, 21s. to 22s., against 21s. 6d. to 22s. 6d.; Paris loaves, 29s. to 29s. 6d., against 30s. 6d. to 31s. 3d.

THE SUGAR CANE.

No. 129.

APRIL 1, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

THE SELECT COMMITTEE ON SUGAR INDUSTRIES.

LAST SITTING.

Mr. C. M. KENNEDY, head of the Commercial Department of the Foreign Office, stated the results of a circular addressed to our Missions abroad in the course of last January, to obtain the latest information on the sugar question from the several countries concerned. From Austria the Foreign Office had been informed that the system of working in bond had been advocated by influential members of the Austrian Legislature. Austria, France, Russia, Germany and the United States, showed no disposition to become parties to an international agreement. Italy might be disposed to take part in negotiations. All these replies, however, merely expressed the opinions of our representatives in the various countries, no direct application having been made to the Governments on the subject. To the Governments of Belgium and Holland application had been made, and the Dutch Government had replied that the question had become the subject of renewed consideration on the part of the Netherlands Government, and that they were ready to consider any proposals likely to lead to a satisfactory result. Belgium was ready to become a party to a treaty, but adhered to her former determination respecting the system of refining in bond.

Mr. Kennedy then proceeded to deal with the question of countervailing duties. We are permitted by treaty to levy countervailing duties equivalent to our excise duties. Such a permission does not exclude other countervailing duties. France had suggested a coun-

tervailing duty on bounty-fed sugars, both at the Conferences and in the note of M. Léon Say, and had, in fact, made it a condition of a future Convention. The existing countervailing duties are on malt, spirits, plate, and playing-cards. He had not looked into the question of tobacco. He was not prepared to say that there were no others. The proposed countervailing duty on foreign bounty-fed sugar is a question of policy and law. As a matter of policy, the Government had already expressed its opinion; as a question of law it would have to be considered by the law officers of the Crown. He could express no official opinion as to the legality of imposing such a duty under our "most favoured nation" clause treaty. His personal opinion was unfavourable. He was aware that a similar question arose in the debate on the Cattle Diseases Act. He thought that in that case it was purely a question of sanitary precaution. He had not read the debate. As far as he recollects, the result of that debate was that cattle from all countries were excluded, power being taken by the Privy Council to allow free entry under certain conditions. This course was adopted in order to avoid infringing the "most favoured nation" clause. Therefore no argument for evading that clause was based on the fact of its being a mere sanitary precaution. The final form of the Act was such as to exclude cattle from all countries, therefore treating all countries alike, and giving power to the Privy Council to allow free entry to countries which, in their opinion, had come under conditions which would entitle the Government to allow their cattle to come in freely. *That course appeared to him to be quite in conformity with international law and practice, because it was treating all countries alike which came under similar conditions with reference to the import of cattle. But he declined to say whether, in his opinion, the same course applied to sugar would also be treating all countries alike which came under similar conditions with reference to the import of sugar.*

The witness then pointed out the advantages of the "most favoured nation" clause, and described cases where infringements of it had been objected to.

With reference to Article XIX. of the Sugar Convention of

1864, relating to a surtax upon sugar exported with bounty, Mr. Kennedy said he was aware that at that time we had "favoured nation" treaties with every country except Spain. In his opinion if that article had been carried out it would have been contrary to the provisions of our treaties. But he admitted that that question was never raised, that Great Britain assented to that principle without any remonstrance, either on the part of our delegate at the Conference or on the part of the Government before ratification, and that, as far as he was aware, no remonstrance was ever made by any of the countries having "favour nation" treaties with us. He read the article, which runs as follows:—"The High Contracting Powers reserve to themselves to agree as to the steps to be taken for obtaining the adhesion of the Governments of other countries to the arrangements of the present Convention. In the event of bounties being granted in the said countries on the exportation of refined sugars, the High Contracting Parties will be at liberty to come to an understanding as to the surtax to be imposed on the importation of refined sugars of and from the said countries."

Mr. Kennedy could not admit that the words "as to the surtax" were directed more to the amount of the surtax than to the principle of the surtax. He contended that the translation did not give the exact meaning of the original French. He doubted whether, if they had used the indefinite article in the original French, it would have been less strong than the definite article.

If there are any other commodities which receive an export bounty, they are, in his opinion, not at all in the same position as sugar. As to the question of a possible bounty on the exportation of iron from Belgium, referred to in a former sitting of the Committee, he had, in consequence, written to our minister in Brussels, and had been informed, in reply, "that there is, in fact, no bounty on the exportation of iron manufactured, from pig-iron imported into Belgium." It is manufactured in bond.

In cross-examination, the witness stated that he interpreted "like goods" to mean goods of the same description, not goods produced under equality of conditions. He admitted that cattle

would be included in the term "like goods." He was doubtful whether beetroot sugar and cane-sugar would be included in the term "like goods." He was inclined to think that one might distinguish between the two for tariff purposes.

Lord Frederick Cavendish asked questions with the view of showing that if the "most favoured nation" clause did admit of countervailing duties being imposed, it would certainly demand that they should be the exact equivalents of the various bounties. But he forgot that the clause would not be infringed if the duty were as low as the lowest bounty. If such a duty were to infringe it, it is being infringed now.

The witness assented to a proposition enunciated by Mr. Collins, that "it would be a safe principle in the matter of a countervailing "duty to let well alone." In the opinion of the witness and Mr. Collins, therefore, the present state of things is satisfactory, the eighteen years of negotiations have been objectless, and the House of Commons had no more reason for appointing a Select Committee than Mr. Collins for accepting the duties of one of its members.

Mr. Stewart endeavoured to ascertain whether there was a bounty on the export of iron from France. Mr. Bell, well acquainted with the iron trade, had on a former occasion dealt with the question whether there was a bounty on the export of iron from Belgium, which has now, from Mr. Kennedy's evidence, been decided in the negative. It is evident that if the probability of a bounty on iron had been as strong in the case of France, Mr. Bell would have called attention to it.

In re-examination, the witness admitted that when Mr. Gladstone said, in the debate on the Cattle Diseases Bill, that "his contention was that those Powers that bound themselves by the same conditions as the five countries proposed to be exempted, were entitled to equality," there was nothing with reference to sanitary measures. He admitted the same with respect to what Sir William Harcourt said on the same occasion, namely, that "what a nation could claim under the 'favoured nation' clause was that there should be an immediate power under similar circumstances to admit it to equal rights with others. They had

"a perfect right to require that they should be admitted to equal rights the moment they were under similar circumstances to other nations." He further admitted that if we were to impose a duty upon all sugar coming into this country unless it was refined or manufactured in bond, providing that countries refining in bond should be admitted free, that that might be held to be answering the description given both by Mr. Gladstone and Sir Wm. Harcourt.

With respect to the declaration of the Government as to their view of the policy of a countervailing duty, to which Mr. Kennedy had referred, his attention was called to the following passage in a report of Mr. Walpole's:—"I take leave further to state that the object of the commercial policy of this country was to enable the foreign producer to compete on equal terms with the British producer in the British market, for the benefit of the consumer in this country; but that it was never intended that its effect should be to debar the British producer from competing on equal terms with the foreigner, even in the home market." The witness was asked whether he thought that a bounty of £2 per ton on a £30 article would be sufficient to prevent the home manufacturer competing on equal terms with the foreigner in his home market. In reply he went so far as to express his readiness to assume, for the purpose of the question, that it would be.

This closed Mr. Kennedy's examination.

Mr. J. H. Lilley, Surveyor General of Her Majesty's Customs, gave evidence as to the practicability of a countervailing duty. He saw no difficulty in carrying out the principle of levying a duty on the importation of sugar, and allowing certain countries, which came under certain conditions, to send their sugar in free of duty. All that would be necessary would be certificates of produce, such as were required when we had differential duties on sugar, cocoa, and spirits. They were issued by proper authorities at the port of shipment. He did not think that evasion of duty would be possible by passing sugar from the country of production through another country whose sugar was not liable to duty, because it would be to the interest of the country whose sugar was duty-free

to prevent the other country from evading the duty. By giving a false certificate of origin they would be destroying their own trade in the article to which they were giving a certificate. They would take care that the sugar to which they gave certificates of origin should be exactly what it professed to be. When certificates of produce were in existence no difficulty was found. Foreign countries would not object to these certificates, because there would be peculiar advantages attached to them. The certificates would, in fact, facilitate the carrying on of their trade. There would be no difficulty in levying the duty if there were fixed rates, not *ad valorem* rates. He did not think any danger to the revenue need be apprehended from refining in bond. All that would be necessary would be an efficient watching of the doors. This need entail no inconvenience on the refiner. The late Mr. Ogilvie, who had more knowledge of the sugar question than any other official, was highly in favour of refining in bond. The witness had had a tobacco manufactory in bond under his control for eleven years. He never had any reason to suppose that the revenue was in any degree injured in this case. The manufacturers did not complain of the supervision of the officer, but were rather pleased to have him there. It is a protection to the property. As to refining sugar in bond, there can be no difficulty about it, either as regards the revenue or the manufacturer.

In cross-examination, the witness explained that it would be necessary to have certificates of origin on sugar coming from all countries. Lord Frederick Cavendish suggested that sugar might evade the duty by coming through and being shipped from a country having no trade in sugar. But he forgot that a country having no trade in sugar could not give a certificate that the sugar was produced there. This was brought out afterwards by Mr. Orr Ewing. Lord Frederick Cavendish then stated that the bounties in the various countries differ widely; and that they differ greatly on raw sugar, on partially refined sugar, and on completely refined sugar. Neither of these statements are according to the evidence, but he endeavoured, nevertheless, to infer from them that it would be necessary to have "an enormous number of

different duties." He further suggested that in the United States, though the home-grown sugar pays no duty, *all* sugar exported receives a large drawback. This is also contrary to the evidence.

Mr. Courtney, in cross-examining the witness, returned to the old story of Mr. St. John and the evidence of 1862. Mr. Lilley met the point by saying that if Mr. Ogilvie had been examined he would have given a different opinion, and that he was more competent to give an opinion than either Mr. St. John or Lord Cottesloe. He also denied that the witnesses examined at that time had had experience of many kinds of refining in bond. Mr. Courtney then brought up Mr. Gadesden's old evidence, although he had had an opportunity of cross-examining Mr. Gadesden himself upon it. He pressed the witness more than once as to there having been many excise duties and much excise supervision at that time, forgetting that the witness was a Custom House Officer and knew nothing whatever of matters connected with the Excise. It is well known that the Excise are perfectly satisfied with the system of manufacturing in bond, and see no difficulty in it. Mr. Courtney then endeavoured to show that refining in bond was defended now because refiners know that they will never have to come under that *régime*. This had been disposed of on former occasions, and was again cleared up in the re-examination of the witness, by showing that at the time when the refiners petitioned for refining in bond there was no idea of abolishing the duties; and that the refiners were so much in earnest that they gave a written undertaking to bear the whole expense of the excise supervision. Mr. Courtney then endeavoured to make it appear that all the foreign countries were indisposed to consider the question of refining in bond, and that they would find the same difficulties as Mr. St. John conjured up 18 years ago. In the re-examination of the witness, this was shown to be exactly the reverse of the fact, as, indeed had frequently been proved on former occasions in the course of the evidence. The Chairman pointed out that France has, under two Conventions, assented to refining in bond; that the National Assembly has passed a law for establishing refining in bond; and that Holland was the Power which proposed refining

in bond at the last Conference. The Chairman might have added that the French manufacturers, who work in bond, have repeatedly given evidence to the effect that, far from being a hindrance, the system of excise supervision is an advantage to them. The witness himself pointed out, in reply to Mr. Courtney, that things have much changed since 1862, and that difficulties which existed then would not exist now. Mr. Courtney then repeated Lord Frederick Cavendish's point, exaggerating it still further by making it appear that the bounty varies with each class of sugar, a statement for which there is no kind of foundation in the evidence. It is to be observed that points of this kind are always brought out in the examination of witnesses who are unable to contradict them. As soon as a witness appears unacquainted with a particular branch of the subject, he is immediately pressed with questions on it, in the hope of eliciting some damaging admissions. Fortunately, the great ability of the Chairman has always enabled him to set this right; but in order to appreciate the true situation in such cases, it is necessary to read the cross-examination and re-examination *pari passu*. Mr. Courtney proceeded to suggest that Austrian, German, and Russian sugar might get mixed when they got to Hamburg. To anyone conversant with the sugar trade this is, of course, an absurd suggestion, but not so absurd as the one which followed, which was that Hungarian and Russian sugar which come to us *by way of Constantinople* might also get mixed. Mr. Courtney, for once, committed the indiscretion of getting out of his element.

The Chairman, in his re-examination of the witness, in addition to clearing up certain points in the way we have described, pointed out that almost every witness had proposed that there should be one countervailing duty, not several; that if a Convention were entered into, the number of bounty-giving countries left outside that Convention would be exceedingly small; that in practice it had been found, in the case of other articles, more convenient to levy one duty, even though it be not accurate in all cases; that, in the case of spirits, the countervailing duty was uniformly 5d. per gallon, although the inequalities it was intended to cover amounted some-

times to 3d. and sometimes to 10d. per gallon; and that the range between 3d. and 10d. was much wider than any possible variation in the sugar bounties; finally, Mr. Ritche pointed out that if a countervailing duty was put upon bounty-fed sugar, the bounty would be discontinued. The manufacturers receiving the bounty would be deprived of all the advantage it gave to them, since the countervailing duty would collect the bounty at the port of import and distribute it among the tax-payers of this country.

FOREIGN SUGAR BOUNTIES.

NEGOCIATIONS FOR A SUGAR CONVENTION.

The following correspondence with the Foreign Office has taken place:—

“ 9, Mincing Lane, February 25, 1880.

“ My Lord,—I am desired by the British Sugar Refiners Committee to inform your Lordship that the beet-root sugar industries of France, Belgium, and Holland are now agreed in desiring that negotiations should be reopened for a Convention for the suppression of bounties on the exportation of sugar, on the basis of manufacturing in bond, and that the French refiners have become parties to the agreement. The Central Committee of French Sugar Manufacturers are now endeavouring to induce their Government to invite a Conference with this object, and are therefore anxious to ascertain whether such a proposal would be favourably received here. I am, therefore, desired by my Committee respectfully to inquire whether your Lordship would be disposed to entertain or lay before the Select Committee on Sugar Industries a proposal for a new Convention on the following basis:

“ Le travail de tous les sucre en entrepôt, là où il y a des impôts sur les sucre. La suppression complète des primes, ou l'annihilation de leurs déplorable conséquences.—I am, &c.,

(Signed) “ JAMES DUNCAN,

“ Chairman of the British Sugar Refiners' Committee.”

(Reply.)

"Foreign Office, March 2, 1880.

"Sir,—I am directed by the Marquis of Salisbury to acknowledge the receipt of your letter of the 25th ult. on the sugar question.

"In reply, I am to state to you, for the information of the Sugar Refiners' Committee, that no communication has been received from the French or any other Government relative to the resumption of negotiations on the sugar question. The latest intelligence received at this office is to the effect that no disposition has been shown, on the part of the French Government, to adopt the system of working in bond for sugar refineries, or to become party to a treaty to regulate sugar drawbacks or other matters connected with the sugar trade; and that, further, as regards Belgium and Holland, there is no disposition on the part of the Government of either country to take steps for the resumption of negotiations.

"The Governments of those countries are, however, well aware that her Majesty's Government are desirous of arriving at a satisfactory settlement of the sugar question, and that *they are ready to give attentive consideration to any proposals for the purpose.*

"The Select Committee of the House of Commons on Sugar Industries having been re-appointed, I am to add that, under all the circumstances of the case, there does not appear to be any reason for departing from the decision that, pending the deliberations of the Committee, Her Majesty's Government should not make further representations on the subject to foreign powers.—I am, &c.,

(Signed) "T. V. LISTER."

THE FOREIGN SUGAR BOUNTIES AND THE GENERAL ELECTION.

On March 10th, a special general conference of the whole of the branches of labour, representing 57,300 men dependent for employment on the home and colonial sugar industry, was held at the Coopers' Trade Hall, Commercial Road, London. Mr. J. Monteith, President of the London Coopers' Association, occupied the chair. The following branches of labour were represented:—Coppersmiths, charcoal burners, coopers, carriers, dock porters, and sugar ware-

housemen, engineers, sugar refining operatives, &c. Mr. S. Peters, general secretary of the Sugar Workmen's Association of Great Britain, read important communications from the President of the Board of Trade, (Viscount Sandon), Professor Fawcett, M.P., Mr. Rathbone, M.P., Mr. A. J. Whitley, M.P., Mr. L. Courtney, M.P., all of which testified to the great importance of the bounty question. He then moved the following resolution:—“That this Conference of workmen's delegates representing every branch of trade and labour dependent for employment upon the British home and colonial sugar industry, most respectfully request the Right Hon. the Chancellor of the Exchequer to receive a national deputation of the representatives of labour from all parts of the country for the purpose of explaining the views held by the working classes upon the foreign export sugar bounty question to the right hon. gentleman. And as this question is of the highest importance to home labour in many of the principal centres of industry, be it resolved that it be forthwith transmitted to Sir Stafford Northcote.” It gave him great pleasure to be able to inform the meeting that he had that day received a communication from the Scottish workmen's committee, to the effect that they intended to wait upon Mr. Gladstone on the subject of the sugar bounties during the right hon. gentleman's electioneering campaign in Midlothian. Mr. Gilman, secretary of the Hand-in-Hand Society of Coopers, seconded the resolution, which was unanimously adopted. Mr. T. M. Kelly moved a resolution of thanks to, and confidence in Mr. Ritchie, M.P. Mr. Phipps, of the London and St. Katharine's Dock Company, seconded the resolution, which was carried. A number of other speakers addressed the meeting.

The Chancellor of the Exchequer sent the following reply to the Workmen's Committee:—“11, Downing Street, Whitehall, March 13, 1880.—Sirs,—The Chancellor of the Exchequer has received your letter of the 11th inst., asking him to receive a national deputation on the subject of the foreign export sugar bounty. He desires me to say that he is very sensible of the importance of the question, but he does not think any advantage would result from his giving the proposed deputation the trouble of coming to Lon-

don, nor could he himself say anything to them except that he hoped that the labours of the Select Committee would not be lost, but that a fresh Committee would be appointed at the very commencement of the new Parliament, which would take up the inquiry at the point which it has already reached.

"I am, Sir, your obedient servant,

(Signed), "JOHN A. KEMPE."

LORD SANDON ON FOREIGN SUGAR BOUNTIES.

On the 16th of March, an influential deputation, comprising delegates from the several trades connected with the home and colonial sugar industries throughout Great Britain, waited upon Lord Sandon at his official residence. Mr. Peter M'Stay, of Liverpool, in introducing the deputation, stated that, owing to the foreign sugar bounties paid by foreign Governments on exported sugar, the British trade in that article was being annihilated. England was paying nearly 12 millions sterling a year to foreigners for an article which she could produce at home and in her colonies under proper arrangements. Taking those circumstances into consideration, he thought that a countervailing duty of something like £2 4s. per ton should be levied. They did not want reciprocity or protection. Their whole aim was to have fair free trade. The foreign bounties, paid by the several Governments abroad, amounted to between £3 and £5 per ton, and that allowed the foreign manufacturers to sell in the British markets at less than prime cost. Lord Sandon, in replying to the deputation, said that he had listened to every word that had been said with the deepest interest, and he might add also that the Government were deeply sensible of the extreme importance of the questions which had been raised. It was a very sad thing to see that the sugar operatives should be suffering as they had done and no doubt were continuing to do owing to the loss of the sugar trade. He had often looked at the sugar industry of this country with a pardonable national pride, for it was one of those industries which had hitherto given work to many thousands of the best class of our artisans. Although, of course, he could not speak on behalf of the Cabinet, but simply for

himself, still he might say that he hoped and trusted that the Parliamentary Committee which had been appointed to inquire into the question would again resume its labours on the sugar bounties at the very first opportunity after the assembling of the new Parliament. They would then be able to complete evidence which they had commenced to take. They would then produce their report. Of course, much depended upon the report of the Committee as to the future line of action to be taken, but he himself was entirely of opinion that the time had arrived for thoroughly sifting the whole matter to the bottom in order to see whether something could be done. The Committee which had been appointed was a thoroughly representative one, and it was presided over by a most able chairman. He was a man who was thoroughly acquainted with the whole details of the case, and while they were in his hands they were sure not only to have a thoroughly exhaustive report but one based upon fair play. It would be the duty of the next Government to seriously take the matter up. Had it not been for the dissolution there was no doubt that the question would have been settled before the end of the present Session. As it was, however, it could only be delayed for a short time. Although he had said that much depended upon the report of the Committee as to the line of action to be taken, still he must not be understood to say that the Government would blindly adopt the suggestions of the Committee. They might have other methods of dealing with the subject than those recommended by the committee. The suggestions of the committee would, however, have great weight.

PROFESSOR FAWCETT, M.P., AND FOREIGN EXPORT BOUNTIES.

The following letter has appeared in the papers:—

“Sir,—Professor Fawcett publicly stated at Hackney, in reference to a duty countervailing export bounties, that he would never be a party to taxing the food of the people. Upon behalf of the workmen dependent on the British sugar industries, we emphatically deny that a duty which taxes a bounty is in any way or manner a tax on food. *It is a tax on bounties—it converts*

them into revenue. *It is not a tax on food, unless State bounties are food.*

"If it is wrong to tax off bounties, it is even more wrong to negotiate their abolition; and yet Mr. Gladstone and the present Administration have persistently tried to deprive sugar consumers of the foreign bounty in the interests of free trade and no protection.

"We are, Sir, yours, &c.,

(Signed) "SAMUEL PETERS,

"THOMAS M. KELLY,

"Secretaries of the Workmen's National Executive Committee for the Abolition of the Foreign Sugar Bounties.

"11, Blackfriars Road, S.E., March 13."

THE WEST INDIA COMMITTEE AND THE SUGAR BOUNTIES.

A meeting of West India planters and merchants was held on the 18th of March, at 9, Billiter Square, to consider the position of this question. Mr. T. Daniel Hill was in the chair, and a number of the principal West India firms were represented. A petition to Parliament had been received from British Guiana with 2500 signatures, showing the injury caused to the colony by the foreign bounty system, and praying for a countervailing duty upon bounty-fed sugar imported into England. Similar petitions had come from Trinidad and Barbadoes. The meeting resolved to take charge of these petitions, and obtain their presentation to the new Parliament. It was also resolved to circulate information among candidates and constituencies on the subject, and it was especially mentioned that agricultural constituencies had a deep interest in the question, inasmuch as the depreciation of the price of sugar by the bounties caused that article to be more largely used in breweries, to the exclusion of malt.

"MANIFESTO OF THE WEST INDIA COMMITTEE.

"*For Candidates and Constituencies.*

"Foreign Governments grant subsidies or bounties on the export of sugar. They do this to foster the beet root industry in France, Belgium, Holland, Germany, and Austria.

"By these means beet-root sugar is largely introduced into the United Kingdom, and sold below its cost of production.

"All other sugar must be sold on a level with these prices, and, being of course without any bounty, is placed in unequal competition with beet sugar, and in a much worse position than would be the case under nature and free trade.

"By this aggressive policy of foreign powers, not only the sugar growing colonies of the British Empire, but all the natural sources of production are injured, restricted, and denied fair play.

"Very large interests in England itself are also attacked. These are : the merchants in the sugar trade, the sugar refiner, the makers and exporters of British goods and manufactures which find their market in sugar producing countries, the ship-owners, the dock proprietors, the engineers and makers of machinery, besides a large artisan and labouring population connected with many trades, and agriculture.

"The colonial trade is of much importance to England. The British West India colonies are better customers than foreign nations. They take upwards of £2 per head of their population of British goods, while France and the United States take respectively under 10s. worth per head of their populations.

"The colonies, and other cane sugar producing countries, do not ask for any advantage in continental markets, but simply for free trade in the English market.

"A countervailing duty, equal to the bounty on beet sugar, would neutralise or take away that bounty, and place all sugars upon an equality in a free and open market.

"Such a duty is considered by members of Parliament on both sides as a free-trade measure, and it would be consistent with English commercial policy, as similar duties are now imposed upon foreign spirits, chicory, and malt, upon cigars as against unmanufactured tobacco, and also upon sugar itself when used in brewing, to make it equal, as regards duty, with malt.

"The subject is most important, too, for the agricultural industry of England. Large portions of land are suited for beet root, but this cannot be utilised because of the beet sugar introduced under

bounty. An important interest for landowner and labourer is, therefore, prevented from being established in England and Ireland.

"The artificial cheapening of sugar restricts the use of malt. In two years—1878 and 1879—sugar was used in brewing as a substitute for more than a million quarters of malt. Sugar was used in 1878 as an equivalent of 509,647 quarters, and in 1879 of 587,699 quarters. The English farmer thus loses between one and two millions sterling annually because of bounty-fed sugar.

"The further application of export bounties to continental manufactures would ruin other industries in England, as it has that of loaf sugar refining. No manufacturing industry would be safe from the selfish caprice of foreign powers. Bounties must, therefore, be stopped at once in the general interest of English capitalists, landowners, manufacturers, artisans, and labourers—in short, in the interest of the free trade prospects of the kingdom.

WEST INDIA COMMITTEE.

9, Billiter Square, London, E.C.

MANIFESTO OF THE WORKMEN'S NATIONAL EXECUTIVE COMMITTEE
FOR THE ABOLITION OF THE FOREIGN SUGAR BOUNTIES.

To the Working Class Electors of Great Britain.

Continental Sugar Bounty System.

British labour has its rights, and it is the duty of the British Parliament to recognise them. Every branch of labour in the British sugar industry has suffered and still suffers a grievous wrong. And if one branch of the community is injured all are injured, for British labour is a body—one and indivisible. Foreigners who cannot beat the British operatives on British markets by fair means, seek to do so by unfair means. Has not British labour accepted free trade and no protection?

Yes! Why then, on British markets, is British labour denied free trade and subjected to hostile foreign protection? Let it be granted that the foreigner has the right to keep the products of British labour from the foreign markets by protective imposts.

But under no circumstances should foreign protectionists be allowed to bring their protectionist artifices, their concealed subsidies, and their export bounties into play on British markets.

Working Men! Insist upon having free trade pure and simple on British markets. Let all goods from all nations be welcome, but without bounties and subsidies. Remember, the foreigners' bribe or bounty, once on the market, immediately destroys free trade competition, and forces, with the aggressive power of protection, the British sugar operative to sacrifice first a portion and then the whole of his weekly earnings. Fellow workmen! call on all parliamentary candidates to declare that they will vote for countervailing duties against foreign bounties, so that all bounties may be kept off British markets and secured as revenue only. Thus the foreigners' state bounty, *not* your food, will be taxed. Be not deceived by empty and meaningless phrases. He alone is the friend of the workmen of this kingdom who supports a practical measure to right a grievous, cruel, and insufferable wrong, such as all statesmen admit the foreign export bounty system to be.

COMPLIMENTARY DINNER TO THE WEST INDIA DELEGATES.

Some months ago the National Conference of the Trade Societies connected with the sugar industries, appointed two delegates, Messrs. Peters and Monteith, as our readers are already aware, to visit the West Indies, in order to ascertain, as far as possible, the effect of the bounty system upon the cultivation of sugar in the colonies in that part of the world. The return of these delegates was celebrated at a complimentary dinner given at Lusby's Banqueting Hall, in the Mile-end Road, on the 25th February. About 200 sat down to dinner. The chair was occupied by Mr. C. T. Ritchie, M.P., who was supported by Messrs. G. Martineau (Secretary of the British Sugar Refiners' Committee), Nevile Lubbock (Vice-President of West India Committee), W. P. B. Shepheard (Barrister-at-Law,

Honorary Adviser to the Workmen's Committee on Treaty and Economic Points), F. M. Alleyne (Barrister-at-Law), J. Ohlson, (Secretary of West India Committee), Samuel Peters (Secretary of the Workmen's Association for the Abolition of Foreign Export Bounties), George Jones (Secretary of the Philanthropic Society of Coopers), C. H. Quinton (Secretary of London Coppersmiths' Society), J. Monteith (President of the London Coopers' Association), J. Strachan (President of the Hand-in-Hand Society), — Phipps (Representative of Workmen employed in London and St. Katharine Docks), Thomas M. Kelly (Secretary of the Workmen's National Committee for the Abolition of Foreign Sugar Bounties), Richard Hunt and Charles Fox, Delegates from the Working Men of Bristol, &c.

After the cloth was cleared, the Chairman called on Mr. Kelly to read letters from the following gentlemen, regretting their inability to attend :—Mr. Samuda, M.P., Mr. T. Scrutton. Mr. G. H. Chambers (Chairman of the London and St. Katharine Dock Company), who wrote as follows :—

“ 4, Mincing Lane,

“ 24th February, 1880.

“ Dear Sir,

“ Had I not made a previous engagement I would certainly have been with you to morrow evening, for it would have afforded me great pleasure to have welcomed Mr. Peters and Mr. Monteith on their return from the West Indies, and to have congratulated them on the able manner in which they have brought our case forward.

“ Fanaticism on any subject does tend to obscure the judgment, and I can recall no more striking instance of a doctrine run wild, or of the sacrifice of the substance in running after the shadow, than we see in the objection to remedy the evils of the bounty system on the ground of a violation of the principles of free trade.

“ Wishing you every success,

“ I remain, Dear Sir,

“ Truly yours,

“ (Signed) GEO. H. CHAMBERS.

“ Mr. Thomas M. Kelly.”

Mr. J. Duncan (Clyde Wharf Refinery, Victoria Docks), who wrote :—

“ 9, Mincing Lane,
“ London, E.C.,

“ 25th February, 1880.

“ Dear Sir,

“ This morning I received your letter and card of invitation for the complimentary banquet, to be given this evening, to welcome the return of Messrs. Peters and Monteith, and I regret very much it is impossible for me to be present with you, but I hope you will have a very pleasant evening.

“ I am most happy to hear through the colonial newspapers that the visit of Messrs. Peters and Monteith has been so successful.

“ The failure (partial) of the beet crop has revived the spirits of the West Indian planters, but I have no hesitation in saying it is quite possible next season we may have a crop of 2,000,000 tons of beet sugar, and that means the ruin of the colonies producing sugar.

“ A farmer from the eastern counties, a man of great energy and intelligence, writes me: Is it not possible to start the growth of sugar beet in the eastern counties of England? I reply, no, you have no bounty, your land is cheaper than in France, labour is cheap, coal is cheap, you can produce quite as good roots, but as long as the grower of beet sugar gets a bounty on his manufacture it is quite impossible for you to compete. Perhaps the royal commission on agriculture may take up this question as it is a great disadvantage the landed interest labour under; the growth of sugar beet means improved cultivation, larger crops of corn, more cattle, and it brings to the land men of great intelligence. I have only to refer to the sugar farms in France, Germany, Austria, &c. &c., for confirmation.

“ Yours very truly,

“(Signed) JAMES DUNCAN.”

Sir John Lubbock, Bart., M.P., Mr. Kelly stated, would also have been present, but was prevented on account of family bereavement.

After the usual loyal toasts had been honoured, the Chairman said, the next toast he was about to submit was one which could

not fail to be of great interest to them all. They were met together on an interesting occasion. It was to do honour to two gentlemen who had been defending their interests a very long way from home. He meant Messrs. Peters and Monteith. (Cheers.) They had heard the manner in which these two gentlemen had performed their mission, and he was satisfied that when they heard an account of the experience of these two gentlemen, their admiration would be greatly increased. He had heard much of what these gentlemen had done in the West Indies, but it was impossible for them to hear anything which would increase his (the chairman's) admiration for the way in which they had discharged their duties. He had often had the pleasure of meeting them, and had been astonished at the amount of information they always displayed in connection with the sugar trade. He (the Chairman) had been connected with the sugar question for many years, and he had no hesitation in saying that the position they had attained had been owing to the exertions of Messrs. Peters, Monteith, and Kelly. (Cheers.) The public, and he might say Parliament, was not fully alive to this question until these gentlemen took it up. He was very glad to acknowledge the obligation he was under to these three gentlemen, and impressed on those before him the obligation they were likewise under, although, at the same time, no efforts on their part would have helped them if their position had not been a sound one. As Chairman of the Parliamentary Committee on this question, they could not expect him to say much on the present occasion, except that the evidence of Mr. Peters had greatly advanced their cause. (Cheers.) He then called on

Mr. PETERS, who was warmly received. This gentleman commenced an interesting address by saying that had not their West Indian fellow-countrymen welcomed them so heartily as they had done, the hearty reception they had met with that night would have fully repaid them. All present were aware that Mr. Monteith and himself were appointed to visit the colonies, to mark the effect of the sugar bounties. Well, the first place they landed at, after leaving England, was Guadeloupe. They were there invited to go over the largest sugar factory in the

island. They went over the factory, and what struck them most was, out of all the machinery on the island, all was of French make. The manager explained the machinery to them, after which they visited the Chamber of Commerce, which body pledged themselves to try and abolish the sugar bounties. They next visited Martinique, and the Chamber there promised them likewise. They then sailed for the island of St. Lucia, where a large sugar refinery was built. They then went to the island of Barbadoes, where they were kindly received. They had public meetings there, which were very enthusiastic, for they had been looking to the time when the workmen of England should take the question up. The next place visited was Trinidad, which was a splendid island, and possessed every advantage for growing sugar. They had visited the fine Central Factory of the Colonial Company where they had twenty-one miles of railway. Everything was there to enable them to fight with the bounty system. There was also land waiting only for the labour. They were also taken to the house where Canon Kingsley stopped on his way through the island. They next went to Demerara, where sugar enough could be produced to supply the whole of Great Britain. They were taken over the works of Mr. Quintin Hogg, which was called Bellair. What was his pleasure here to find, while the whole of the French machinery was lying idle, all the English machinery was in full work. That was a reply to those who said they did not know their trade, seeing that Mr. Hogg with a view to his own advantage, had given the fairest trial to both English and French machinery. If Demerara had fair play and confidence restored, it would supply sufficient sugar for the consumption of Great Britain, in addition to coffee and cocoa. The effect of the bounty system on their West Indian colonies was most injurious. If the bounty system had not been in operation, the supply imported would have been from one million to fifteen hundred thousand tons annually. The workmen's committee of this country was entrusted with a great charge. The colonies had entrusted them to carry this measure through. They would do their best to convince Parliament of the necessity of putting the sugar trade on a fair footing. The great trade councils had passed

resolutions in their favour, for they only asked for a free-trade measure. He hoped the *refiners'* and West India Committees would do the same thing, and he had no doubt they would be successful. He must be a bold man who would stand up in the House of Commons and say, "Perish the sugar trade!" They only wanted free trade in the English markets; and if Parliament passed a measure abolishing these bounties they would do a service to the whole of Europe. Let them all unite, and do all they could in supporting their chairman, who was entrusted with the destinies of the sugar interests; and God grant he would bring the question to a successful and speedy issue.

Mr. MONTEITH, who was also cheered, thanked the company for the way they had been received, and said the more the colonies were cultivated, the better it would be for England. There was no doubt, if the bounty system went on, some of the largest estates would go out of cultivation. In Demerara they had the start of the other colonies, for they had a large dry dock, attached to which were large saw mills, engineers' shops, &c. He was much impressed by the satisfactory condition of the coolies, who could earn as much in a day, as would support them for three. He hoped the Parliamentary committee would see their way clear to find a solution of the question. All they wanted was free trade,—justice to all and favour to none: they only wanted fair play. Mr. Scrutton very kindly gave them a passage to the West Indies, and he thought it right to give that gentleman a vote of thanks. (Cheers.)

Mr. QUINTON (Secretary London Coppersmiths' Society) then proposed "Success and prosperity to their West India Colonies," coupled with the name of Mr. Nevile Lubbock.

Mr. N. LUBBOCK, in reply, said it gave him great pleasure to respond to the toast. He had travelled over the same ground as their delegates. He thanked Mr. Ritchie for the most powerful and very able support he had given them in this question. If these sugar bounties continued in force, he was satisfied that the toast to which he had the pleasure of replying would become a thing of the past, and that it never would be realised so long as the sugar bounties continued, or the Government of this country

did not resort to some neutralising measure. (Cheers). He had visited the West Indies, and it was partly owing to his representations that the Colonial Company had established their factory. They had laid out £200,000 in their works and in the construction of their railway. Ten years ago capitalists would not hesitate to embark large sums in the sugar trade, but now they would not risk a shilling. (Hear, hear.) He was sure the meeting would agree with him that our West India Colonies had a right to claim that their products should be admitted into English markets on conditions of equality, with the products of foreign countries, and that prices in English markets should be regulated, not by the caprice or folly of foreign governments, but by the Free Trade competition of the world. (Hear, hear, and loud cheers.)

Mr. KELLY then proposed "That a hearty vote of thanks be given to Mr. C. T. Ritchie, for his exertions in Parliament on their behalf." No agitation that had occurred for the last twenty years had done so much to define free trade. The principles of free trade were true if rigidly carried out. There was no industry in the country suffering as the sugar industry. The bounty on export destroyed competition. Had they not an illustration of the ravages of this system in their midst, for they had twenty-five large sugar manufactories shut up. They proposed to impose a duty equal to the bounty, and keep in their country nearly twelve millions of money which ought to be spent for wages. The opposition which Mr. Lowe and Mr. Forster had given this movement had struck the Liberal working men with amazement. They had had a most important interview with Mr. Childers, who said the countervailing duty was in strict accordance with free trade. Here was their respected chairman at the helm—(loud and continued cheers)—and he ventured to say that he would, ere long, do as much good for them as any man who said he was the champion of the working classes. The whole of the working men of the country were hand in hand with them in regard to the countervailing system. There could not be any security to home industry while the bounty system prevailed. Between 30,000 to 40,000 workmen were now out of employment through the present

unfair system, and a man who would stand up in the House of Commons and vent their grievances, as Mr. Ritchie had done, deserved their thanks, and he begged to move it. (Cheers.)

Mr. GILMAN seconded the motion, saying it was their bounden duty to thank Mr. Ritchie for obtaining a Select Committee to inquire into their grievance. Their member was a young man in the House of Commons, but not one of their former representatives had come forward so readily and willingly to champion their cause as he had done, and it was through his influence they were in that hall that night. The time was not far distant when the electors would be called on to select their representatives for a new Parliament, and whenever that time should arrive he predicted that they would place Mr. Ritchie where he deserved to be placed—at the head of the poll. (Cheers.)

Mr. PHIPPS (London Docks) followed by proposing "The Health of the Chairman," observing that when the time came he would find his constituents true to the core.

The toast having been drunk amid cheers,

The CHAIRMAN, in reply, said that they had been good enough that evening to drink his health in two capacities, one for presiding that evening, and the other for championing their cause with regard to the sugar bounties. In the first place, with regard to taking the chair that evening he felt himself amply repaid by hearing the account of the delegates' mission; and with regard to his other capacity as champion of the sugar trade, he felt it devolved on him to endeavour to obtain fair play for the many thousands interested. It was shortly after he was returned to Parliament that he had the matter brought under his notice, and he immediately brought it before Parliament, not with the view then of effecting a remedy or bringing about an alteration of things, but to urge the Government to inquire into the system, with a view to effect a remedy for the state of things which now existed. They all knew how indefatigable the Government had been in bringing about negotiations in order to put an end to this system—(hear, hear)—and when apparently they had been on the

brink of success, and the prize almost within their grasp, the cup, by some means or another, had always been dashed away. Their friends thought this was a state of things which should not be allowed to continue. Well, it was the opinion of some that he should at once ask the House of Commons to give an opinion on that which was the only remedy open to them. (Hear, hear.) But while agreeing with them as to the need of an alteration, he did not think the time had quite arrived for taking that particular step. He considered it would materially advance their cause were they first to have a full and impartial inquiry, and he believed the result of the investigation of the Committee would be so convincing as to bring all parties concerned in agreeing that an alteration should at once be effected. (Loud cheers.) They were successful in obtaining an inquiry, and all he felt now possible for them to do was to work strictly within the policy of the country—free trade. (Cheers.) They had their inquiry, and had obtained a vast amount of valuable evidence; but, unfortunately last year they were unable to complete it, although he hoped in a few days to be able to resume it. He did not think the inquiry would now be of long duration, and as soon as he could draw out his draft report, the Committee would meet and discuss it. He had every hope that they would finish it before the Easter recess, and that they should be able to devise some means to bring about a resumption of that prosperity of the loaf-sugar refining trade in the Tower Hamlets, as well as some guarantee to their West Indian fellow countrymen. (Loud cheers.) Whatever the report should be, they might rely on it that he would endeavour to bring about a state of things they all desired to see, and now he had once put his hand to the plough, he did not intend to take it away. (Cheers.)

On the suggestion of Mr. PETERS, a collection was made on behalf of the inhabitants of St. Kitts, which had lately suffered from severe floods.

Several other speeches followed, all bearing on the question they had met to consider.

A DUTY TO COUNTERVAIL AN EXPORT BOUNTY IS

"not only perfectly consistent with Free Trade, but positively conceived in the interests of Free Trade."—*Spectator*.

"an attempt to neutralise a deliberate disturbance of the rules of natural advantage."—*Spectator*.

"The project of a countervailing duty does not, so far as we can see, involve any return to protection."—*Saturday Review*.

"In theory countervailing duties are quite in accordance with Free Trade. If a foreign country chooses to disturb one of our home trades by giving a bounty, we are quite at liberty to redress the balance, so far as we are concerned, by a countervailing duty, in order to preserve the trade as much as possible in its natural course."—*Statist*.

Sugar coming here with a foreign export bounty is sold below cost price.

This injures the consumer by restricting his supply to artificial instead of natural sources of production.

But free trade demands free access to all natural sources of production; and therefore the consumer of to-day can only enjoy the bounty at the expense of the consumer of to-morrow.

Liberal and Conservative administrations have for years been negotiating to restore free competition, and thereby deprive the consumer of the foreign bounty by its abolition.

France will abolish her bounty provided that England will neutralize the export bounties of other countries by countervailing duties.

The acceptance of the principle of such a duty is, therefore, all that is necessary for the settlement of the question. Bounties thus intercepted, failing in their purpose, would be universally abolished.

Such a duty is a tax on bounties, not a tax on food. The bounty-giving countries would pay the duty out of their bounty, whilst all other countries would enter duty-free, and prices would be restored to their free-trade level.

The foreign bounty would thus either go to the relief of British taxation or vanish ; and, in either case, free competition—access to the natural sources of production—would be restored.

Countervailing differs from abolishing bounties, in that the one accepts and the other rejects the foreign tribute: the one is effectual and within our power, whilst the other is a matter of fruitless negotiation, and dependent on the caprice of foreigners.

The only differences, therefore, between a countervailing duty and negotiation are,—first, that the one is effectual and the other is not; and, secondly, that the one accepts the bounty and the other rejects it.

A FEW REMARKS UPON THE USE AND ABUSE OF LIME IN THE MANUFACTURE OF SUGAR.

Suggested by the "Zeelandia" Experiment.

There are many persons in the world, chemists and others, who tell us that lime is an unmitigated evil, and beseech us to abolish it from our boiling-houses altogether, asserting that by its use we lose a very large per centage of the crystallizable sugar in the cane, and that there are other and better clarificants to be obtained. None, however, seem yet to have succeeded in introducing a system without lime that is sufficiently perfect to warrant its general adoption.

Among others, there have been accounts, at uncertain intervals, in the *Sugar Cane*, of trials of "Gill's Process;" but, unfortunately, they seem to be generally failures. We first read the failure, and then follows Mr. Gill's apology for the same, in which he shows that some little detail has been omitted, which, if it had been carried out, would have ensured the success of the experiment; but which, being left out, turned the tables against the operator. And this occurs upon nearly every occasion. I do not wish to disparage Mr. Gill's process. Unfortunately the descriptive details are so few that I know hardly anything of it, except that sand separators and a galvanic battery of some form are used. But we have the verdict of

the gentlemen who tried it at Zealandia, that "It is capable of being modified, and converted into a valuable system of sugar manufacture." We also know that it is a system in which lime takes no part; in fact, its very name seems abhorrent to Mr. Gill. He calls it "The miserable lime," which lays "the foundation on which molasses is built." Yet, "What are the facts" of the Zealandia experiment? "Those 23,200 gallons contained 36,656 lbs. of sugar, and realised 19,802 lbs., or say 54 per cent., and the molasses filled 13 puncheons and 1 barrel, the net weight being 16,409 lbs."—54 per cent. of sugar, 46 per cent. of molasses!!! This does not speak well for the process; *lime, with all its faults, would have done better.* But let us analyse these figures with reference to their cane value, and to do this we must assume some data which are not given us. The number of gallons of juice given is 23,200, and the average density 9.7° Beaumé. This gives us a weight of juice of 248,240 lbs. Suppose the mill, being a good one, yields 68 per cent. extraction on the average, which is a high average for even good mills, we arrive at 365,058 lbs. as the weight of canes dealt with, and the sugar result is stated at 19,802 lbs., or not quite $5\frac{1}{2}$ per cent. of the weight of the canes. This is simply miserable. Many of the large *usines* in the French islands return this amount to the cultivator as his share, and they pay all costs of manufacture and most of the haulage, and get their profit out of the surplus yield. Their average return is about 8 per cent. (7.92) of the weight of the canes, and the density of their juice is about the same, on the average, as that of the Zealandia experiment. Perhaps it would be fairer, as the Zealandia molasses was not re-boiled, to state that their average return of 1st jet *only* is $6\frac{1}{4}$ (although I have my doubts if the ordinary amount of 2nd jet could be obtained from those casks of molasses at Zealandia, and suspect that they would be found too acid to yield crystals enough to pay for the conversion). It must also be remembered that the French *usine* crystals are a much higher grade than "Demerara;" so that we find their yield of first quality crystals, by a process in which lime is freely used, is $12\frac{1}{2}$ per cent. more, on the year's average of their daily work, than was obtained by a *special experiment*, con-

ducted by gentlemen of known ability, of a process in which lime takes no part. Let us look at the experiment from another point of view. We are led to believe that Mr. Gill's process results in less skimmings than the ordinary method. The juice treated polarised 1·58 lbs. crystallizable sugar, and ·08 glucose per gallon; \therefore total solids = $1\cdot66 \times 23,200 = 38,512$ lbs., of which $19,802 + 16,409 = 36,211$ was obtained, leaving at least a ton of solids unaccounted for, of which the greater portion was crystallizable sugar. Of course, as this is based upon polariscope readings, it is over and above the gummy matters, which would vitiate the value of hydrometric data. If we take another basis, we have, according to Dr. Icerry's tables, juice of $9\frac{3}{4}^\circ$ Beaumé contains 1·8 lbs. of crystallizable sugar per gallon. $1\cdot8 \times 23,200 = 41,750$ lbs. sugar, showing a deficit of about $2\frac{1}{2}$ tons, or 11 per cent. of the whole, in waste. This is still less satisfactory for a process which aims at reducing waste. If we take the result per gallon of juice ground, it is still more disappointing, being only ·85 lb. of sugar.* From juice of 10° Beaume I have obtained, as the average of a month's work, 1·72 lbs. per gallon† of concrete sugar landed in England, or 91 per cent. of the theoretical quantity; and although lime was freely used, there was no molasses. And I see in the *Sugar Cane* for March, 1874, that M. Hjardemaal states he has obtained 1·98½ lbs. (from same density of juice) of concrete sugar, but whether selling weight or not he does not say.

I do not mean to assert that the foregoing result can be obtained every day, nor that it was the result of lime—it was the result of

* It is rather a remarkable coincidence that ·85lb. of sugar was the exact amount obtained by the Demerara experiment with the sulphurous acid gas process, of which Mr. Gill writes in the *Sugar Cane* of May, 1874, and remarks:—"It may be desirable to preserve those figures" (301,700 gallons of cane juice produced 256,743lbs. of dry sugar), "as we are on the eve of other figures, which are expected to result from my process conducted under superior auspices." Where is the increased product of from 25 to 50 per cent. which he confidently promised us over this sulphurous acid gas process, in the October number of the *Sugar Cane* for 1874?

† There was some drainage from this concrete on the homeward voyage, although none whatever in the curing house.

GOOD SOUND CANES FRESHLY CUT; and I care not what the system is, if this factor of *good sound canes freshly cut* is not omitted from the equation, good results will follow, whether lime is added or not. My experience convinces me that more sugar is spoilt from want of lime than over-liming, and that the addition of lime does not necessarily mean the production of molasses. Canes must be sound and freshly cut to make good sugar; but no process that deals with a large bulk of juice at a time will make sugar without molasses even then, for molasses will be made in the *cooling process*. But we cannot always obtain sound canes. Winds wrench and wring them whilst growing, giving them what is technically known as "hollow heart;" the "borer" does his work with fearful energy sometimes; rats damage them wholesale; dry seasons cause the canes to get sunburnt and over-ripe before they are cut; in wet seasons the weight of cane grown is often heavier than can be borne upright, and canes are laid and rot at the joints; and there are very few seasons that a planter can gather in the whole of his crop sound and freshly cut. All the foregoing result in one thing, *acidity*, and ACIDITY IS A GREATER ENEMY THAN LIME, and must be got rid of at any cost. Hitherto we have found lime the cheapest, safest, and most effective agent for the purpose. It may not be the best, and I do not mean to state that it is; but it is the best I know of yet. Some years ago the inventor of the Concretor endeavoured to make concrete sugar without lime, and failed, notwithstanding the admirable system of concentration he adopted, and finally had to return to the old plan of tempering his juice with lime. I believe that nine-tenths of the molasses made is from faulty concentration. Syrups cannot be brought to such a state of supersaturation, by any of the ordinary processes, as to render them a mass of crystals on cooling; nor, if they could, would the present method of cooling attain such a result. The consequence is, that a large portion of the syrup (not necessarily molasses) is left with the sugar in our coolers. This, if perfectly neutral, could at once be re-boiled; but acidity soon sets in, and the syrup becomes molasses. Even with the most expensive processes—*e.g.*, triple effet and vacuum pan, as used in the large French usines—no better result than 8 per

cent. of the weight of the canes in 1st and 2nd crystals is obtained, because the syrups are treated in too large a quantity at one time. This, I think, is the great advantage secured in the Concretor, the cylinder of which, being filled with a large number of volute sheets, the juice is dealt with in thin films passing over the enormous surface thus secured, and is dried in its evaporation to a much greater degree than is possible by any other method, the result being that no molasses is made. For some years I have been using one of Fryer's patent Concretor cylinders (L size) to effect the final concentration of my syrups. At first I used the complete machine, but, as I have before stated in the *Sugar Cane*, I was led to believe, by daily use of it, that the tray portion was a mistake, and finally abandoned it three years ago, retaining the cylinder, and fixing it to take syrup from the battery of tayches, the necessary heated air being obtained from a horizontal air-heater placed after the multi-tubular boiler. This arrangement answers perfectly, and by this means I can work off the crop with scarcely any molasses. In fact, if I made *all* concrete I should have no molasses; but I find it more convenient to take off the last strike every night as Muscovado, as after the tache fire is stopped, our supply of heated air fails. In this way nearly 500 tons was made last year, with very little more molasses than was obtained from the Zealandia experiment. I think, therefore, that it is clear that lime, judiciously used, is not the cause of molasses. I always temper my juice after skimming, so as to give a slight *alkaline* reaction to litmus, and find that by so doing it takes less lime than if rendered perfectly neutral (or, according to the practice of some, slightly acid) at first, and lime added as acid is developed in the process. By the time the juice is boiled to 30° Beaumé, it will be found to be neutral. Mr. Gill will tell me that I thereby liberate gummy matters to rob me of sugar. This may be so, *but acid will rob me of more*; and as I find that I can obtain 91 per cent. of the theoretical quantity of crystals contained in the juice by this system, it is unlikely that I shall abandon it until a better is satisfactorily shown me. There can be no doubt that we want a more perfect clarificant, and if Mr. Gill's process [gives us this it is a valuable addition to our manufacturing appliances, and

I should like nothing better than to give it a good trial; but I feel sure that if lime were used, and the juice rendered slightly *alkaline*, without loss of time, after the separation of the albumen and cellulose particles, which I understand he removes by galvanism and sand filtration, a better result would be obtained than that reported from "Zeelandia." One requires to know far more of his system than the oracular nature of his writing permits. I do not know, even, whether he has patented it or not. If he has, there can be no reason why it should not be clearly stated to the public, so that they could judge of its merits; if he has not, and does not intend to patent, but wishes planters generally to benefit by his researches, there is still more reason for a complete description of his system and apparatus. I would venture to suggest that there is little to be gained, under any circumstances, by sneering at "so-called practicals." I do not think planters, as a rule, are at all averse to testing new processes if a reasonable probability is shown of their success; but they are cautious men, and as, in many instances, they are acting for absentee proprietors, it cannot be wondered at that reluctance is shown to making radical alterations in their treatment of cane-juice until such alteration is shown to be an improvement. It is not very long ago a gentleman was among us who differed diametrically in his treatment from Mr. Gill, and endeavoured to show us that what we ought to do was to turn our cane-juice into a kind of sucrate of lime, and thus effectively prevent acidity and its train of evils, and leave it to a central manufactory and refinery to abstract the lime by carbonic acid gas; and I believe this gentleman has successfully proved his theory in Australia. "Who shall decide when doctors disagree?"

J. SPENCER HOLLINGS.

Notwithstanding the fact that a law was enacted in Brazil in the year 1831 prohibiting slavery, one of the principal journals of Rio Janeiro publishes an advertisement of the public sale of sixty Africans to take place at Valença. The press of Rio have given the matter special publicity, and the people freely discuss this clear infraction of the law, but the authorities are entirely oblivious to the whole matter. It would seem that the Government had not been particular in enforcing the slave trade law since its enactment, for although there have been no public sales, the private traffic and captivity of Africans has existed and still exists.

DIFFUSION APPLIED TO CANE AND BAGASSE.

TRIALS AT GUADALOUPÉ IN 1879.

Translated from the French.

Experiments were made with the following results, during the working season of 1879, at the *Usine Blanchet*, belonging to Messrs. Monnerot and Co., for the purpose of ascertaining the conditions in which diffusion, applied to the extraction of juice from cane or bagasse, could be best effected, and of determining its advantages and superiority over the methods at present in use by mills and *imbibition*.

The matter for diffusion represents 40 per cent. of the weight of the canes, and contains 30 per cent. of normal juice of the canes, or 75 per cent. of the bagasse; that is, 4 per cent. of the weight of the canes in sugar, or 10·47 of bagasse.

Value of Extraction by Mills and Imbibition.

According to our observations, the sugar contained in 100 kilos. of canes was apportioned as follows:—

Normal juice.

Density, 1·068.

Crystallizable sugar, 15·30, or 90 per cent. of the canes.

Crystallizable sugar per 100 kilos. of canes, 13.77.

Extraction of raw juice.—First mill and imbibition united, 85 kilos., say—

	Raw Juice.	Normal.
From first mill	60	60
From <i>imbibition</i>	25	11
	—	—
	85	71

Therefore 71 kilos. of actual normal juice being submitted to operation—

$$\frac{71 \times 15.30}{100} = 10.86 \text{ of sugar} \dots \dots \dots \quad 10.86$$

Lost in the bagasse 2:91

The work of purification and crystallization gives for 10·86 of sugar entered (representing 12·05 of *masse cuite*, first jet)—

Sugar extracted—1, 2, 3	9·25
Lost in the molasses	0·75
Lost in <i>fabrication</i>	0·86
	—
	10·86

These values evidently undergo variations in richness of the original products, but the proportion of extraction is not sensibly modified. We may, therefore, admit a loss of 2·5 per cent. from the cane in the bagasse after imbibition.

FIRST TRIAL.

Rough Bagasse.—The bagasse employed is that thrown from the first mill, and taken before the addition of water on the chain of *imbibition*.

Ten diffusors were charged with this bagasse, selected in the best state of division obtained from the mill, and heaped up.

The bagasse occupies the entire volume of each diffusor—say 2 hectolitres 82 litres; and the mean weight ascertained is 63 kilos. 6 of heaped-up bagasse.

The time of maceration (20 minutes, with water at the mean temperature of 80° C.) having been judged sufficient, the routine was commenced. The discharge and re-charge of the vessels proceeded continuously and rapidly with the view of hastening the exhaustion and increasing the density.

The density whilst running was not above 10·25, and the temperature of the diffusing juice, measured by the calorimeter, was raised and maintained in serial order from 75° to 95°.

The temperature of the stream did not exceed 45°.

Division of the bagasse: Advantages.

The incomplete and unequal division of the bagasse produced by the first mill not permitting a satisfactorily-economical extraction, a Filter straw-cutting machine was utilised for its division, and this more minute division had good effect—first, the raising of the weight of the charge and bringing up to 75 kilos.

The more complete utilisation of water, the co-efficient mixture

of which with the bagasse increasing, resulted also in an increase in the density of the juices and the value of the extraction. A rapid elevation of density was observed in the three vessels charged with the divided (or chopped) bagasse.

For a while the density of the running liquor was maintained between 1·035 and 1·040, which implies a very satisfactory progress of the liquid diffusor, which could not have been obtained with imperfectly divided bagasse.

Quantity worked.

The quantity of diffused bagasse may be given as follows:—

	Kilos.	Number of Vessels Diffused.	Mean Weight per Vessel.
Rough bagasse from the first mill	1·145	18	63 k. 6
Bagasse divided by the cutter	225	3	75 k.
Total	1·370	21	

This volume consisted of—

Volume of diluted extract of the juice.

	Density.
Juice received and guaged at the stream	1·025
Juice guaged at the liquidation ..	5·80
	15·80

Total volume of diluted juice at the density of the stream, 1·025, is therefore 13 hectolitres 50 f., say:—

Return in diluted juice.

	Volume.	Weight.
Per cent. of bagasse	100 lit.	102 k. 5
Per cent. of cane (40 per cent. of bagasse)	40 lit.	41 k.

Return of normal juice:

The normal juice of the canes worked, the product of the diffused bagasse, had a density of 1·060.

The return of the normal juice by diffusion of the bagasse of the first pressure is therefore: $\frac{102.5 \times 2.5 \times 100}{6.1} = 42$ kil. per cent. of bagasse and 16k. 80 per cent. kilogrammes of canes.

Water of Dilution:

Taken at 100 kilos. of canes, the weight of water used is
 $41 - 16.80 = 24.20$ per cent.

Composition of Products:

	WORK OF THE MILLS. JUICE.			DIFFUSION.		
	Normal	Repre- sion.	Mix- ture.	A	B	C
Density at 28° C.	1.061	10.40	1.054	1.023	1.029	1.025
Sugar per hectolitre	15.3	9.89	13.3	5.76	4.86	6.10
Sugar per 100 kil.	14.42	9.50	12.61	5.60	4.70	5.90
Uncrystallisable per hect.	1.	0.66	0.86	0.55	0.49	0.60
Uncrystallisable % sugar	6.53	6.67	6.45	9.50	10.	9.90
Purity	92.56	90.89	91.23	86.94	91.26	91.50

SECOND TRIAL.

Cut bagasse:

This trial was made exclusively with bagasse, slashed with a straw cutter.

The weight worked was 950 kilos., distributed in 13 vessels, say 75 kilos. per vessel.

Return in diluted juice (vol.):

Juice received and guaged at the stream.... 3h. 8 at 1.046

Ditto of liquidation..... 5h. 4 at 1.025

That which represents the density ascertained (during the running), 1.046, a total volume of 6 hectolitres 72 litres.

Thus—per cent. of bagasse..... 70 l. 70 .. 73 k. 85

Ditto of canes 28 l. 28 .. 29 k. 54

Return in normal juice:

On these bases the return in normal juice is:

$$\frac{73.85 \times 4.6 \times 100}{6.3} = 53.93 \text{ per cent. of bagasse.}$$

21.57 , canes.

Water of Dilution:

Its weight per cent. of canes is represented by $29.54 - 21.57 =$ about 8 per cent.

Composition of the Products :

	FROM THE MILLS.			DIFFU- SION.
	Normal.	JUICE. Repres- sion.	Current.	
Density	1·063	1·046	10·58	1·046
Sugar per hectolitre	15·64	11·10	14·30	10·61
Sugar per cent. kilos	14·71	10·61	13·51	10·14
Uncrystallisable per hectolitre	1·06	0·69	0·89	1·
Uncrystallisable per cent. of sugar...	6·77	6·20	6·20	9·40
Purity	91·8	89·46	90·22	85·51

Apparent and real density of the bagasse divided and heaped up :

According to our observations the divided and heaped bagasse has for :

Apparent density.... 0·268, that is 268 k. the m. c.

Real density..... 0·448 ,, 448 k. ,,

Without increase of apparent volume the divided bagasse absorbs 120 per cent. of its weight of water.

Quality of products :

The comparative value between the composition of the juice expressed by the mills, and those of the diffusion stream, we find as follows :

	Normal juice.	Repression.	Diffusion.
Density	1·063	1·046	1·046
Purity.....	91·8	89·46	85·61
Remaining uncrystallised	6·77	6·20	9·40

The troublesome increase of the centesimal relation of uncrystallised to crystallised sugar should not occur in a normal industrial work, the inevitable slowness of operations of carrying, dividing, weighing, loading of the bagasse destined for our trials, is certainly the only cause.

The diffusion juices of the bagasse have a reddish brown tint. They are very limpid and free from *debris* or matters in suspension. The filtration in battery is effected to a marvel.

We are bound to admit that, with rapidity in working, these juices will possess a high degree of purity, and that the inversion of the sugar will be greatly lessened.

Consumption of water :

The consumption of water is apportioned thus:

	Per cent. of Bagasse.	Per cent. of Canes.
Water for dilution of the juice	25	10
Cleansing water	153	61·2
Absorption water for bagasse	120	48
Total.....	<hr/>	<hr/>
	298	48
	<hr/>	<hr/>

CONCLUSIONS.

The preliminary division of the bagasse is imperiously required in the application of diffusion to the extraction of the juice.

In these conditions, bagasse is very well suited to diffusion.

The return in normal juice with a proportion of water of 10 per cent. of canes is capable of reaching 22 per cent. of their weight.

With rapidity in working, the purity of the juice will be equal, if not superior, to that of the juices from imbibition.

The system of the long battery should be adopted.

There is room for thought in devising economical means—

1st. For dividing the bagasse.

2nd. For eliminating the excess of water it contains in the proportion of 120 per cent., the most serious obstacle to its indispensable use as fuel.

DIFFUSION OF THE CANE.

The canes were cut into round slices by means of knives fixed in the openings of a plane desk, against which the stalks were brought to bear at an inclination of about 45 degrees; the slices cut of the thickness of two to three millimetres were thrown off from the openings of the disc through which the knives project.

First experiment :

The weight of the cane slices, heaped up and diffused, was 725 kilos, corresponding to 100 kilos per diffusor; the mean time of maceration was 30 minutes.

The following table sums up the progress of the battery, considered at the point of view of the densimetric increase of the composition of the products.

COMPOSITION OF THE PRODUCTS.

	No. of the Diffu- sor.	DEN- SITY.	Crystal- lisable per hect'litre	Unchris- tallisable per hect'litre	PURITY.	Unchris- tallisable per cent. of sugar
	1	1·039	..	..	..	..
	2	1·050	12·05	0·72	88·44	6·
	3	1·055	12·77	0·72	86·07	5·8
	4	1·057	13·12	0·77	85·28	6·
This vessel was half- filled with cane....	5	1·057	13·12	0·77	85·28	6·
Composition of normal juice .....	..	1·062	14·20	0·89	84·63	6·3

The temperature of the juice entering into diffusion, measured by the calorimeters, was kept up to close upon 85°. The temperature of the current had not exceeded 40°.

In this trial we have the following result :

Return in diluted juice :

	DENSITY.	ASCERTAINED.	VOLUME.	REDUCED TO 1·057.
Juice of the current....	1·057	2h. 80	2h. 80	
Ditto	1·055	16 0	1 54	
Juice of liquidation....	1·025	46 0	2 0	

Vol. of diluted juice extracted, 725 kilos. of canes,
reduced to the density of the current hect. 6h. 34

Return of normal juice (say per cent. of canes), volume 87 l. 40,
weight 92 k. 38 :

On these bases, the return in normal juice is per 100 kilos. of canes $\frac{92\cdot38 \times 5\cdot7 \times 100}{6\cdot2} = 84\cdot90$ per cent.

The proportion of water does not exceed 8 per cent.

Second Experiment :

The second experiment was made on the same conditions of slicing the cane. The weight rose to 2·250 kilos. apportioned in 14 diffusors—that is, 160 kilos. per vessel.

The quantities of juice collected and guaged was as follows :

Return of diluted juice:

Density.	Ascertained.	VOLUME. Reduced to 1·060
1·061	5 h. 6	5 h. 60
1·056	5 6	5 22
1·053	2 6	2 30
1·043	5 0	3 58
1·025	4 5	1 86

Volume of diluted juice extracted from 2·250 kilos. of canes
and reduced to the density of the current hect. 18·56
Say per centage of canes; volume lit. 82·50
weight kil. 87·45

Return of normal juice:

$$\frac{87\cdot45 \times 61 \times 100}{6\cdot3} = 84\cdot50$$

Composition of the products:

	WORK OF THE MILLS.			DIFFUSION.		
	JUICE.			CURRENT.		
	Normal Juice.	Repres- sion.	Mixture.	A.	B.	C.
Density	1·063	1·046	1·056	1·066	10·60	1·064
Sugar per hectolitre	14·74	10·97	13·30	15·82	14·38	15·10
Uncrystallisable do.	1·04	0·67	0·89	0·85	0·92	1·09
Sugar per cent....	13·88	10·48	12·60	14·84	13·57	14·19
Purity	87·6	87·3	87·4	88·43	88·29	87·
Uncrust. % of sugar	7	6·6	6·6	5·4	6·4	7·2

We found for apparent density of the heaped-up slices of canes, 0·568, that is, 568 kilos. cube meter.

The exhausted cane holds 91 to 92 per cent. of water. At the mill, the exhausted slices were presented in a state of division very favourable to an increase of rapid desiccation. They did not possess too great a friability to injure their use as fuel.

The diffusion juices of the cane had a light amber tint, and their colour did not much darken with the increase of density. Their limpidity was really surprising.

The consumption of water corresponded, per cent. of canes :

Dilution water of initial juice	5
Absorption water.....	15
Cleansing water	70

By the use of compressed air or steam, with the *montejuice*, we succeeded in economising the whole of the cleansing water, and certainly an important fraction of the absorption water; in so much that we nearly attained this excellent result—not having so much absorption water as was substituted for the normal juice displaced, and brought back to its natural strength.

Diffusion appears calculated to solve this important industrial problem: the almost absolute extraction of cane juice, the reduction of manual labour, the first cost and maintenance of the plant required for extraction, increased return, by the purity of its products and facility of clarification.

Diffusion will definitely enter into colonial industrial practice, when a powerful and rational instrument suited to the proper slicing of the cane shall complete the process, as has been the case of root cutting in the indigenous sugar industry.

(Signed) RIFFARD.

Pour copie conforme,

Usine Blanchet.

A. JOUIN & Co.

SUGAR PRODUCTION IN CALIFORNIA.

By PROFESSOR E. W. HILGARD, State University.

The late rise in the prices of sugars has once more directed public attention strongly to the possibilities of producing at home this important article, whose increasing consumption shows that it is more and more taking the position of an article of food instead of that of a mere condiment. The movement toward the large-scale culture of sorghum for this purpose at the East is significant of an intention to become independent, if possible, of the frequent and violent fluctuations in the price of a prime necessary of life, brought about partly by speculative operations, partly by the political troubles to which several of the sugar-cane growing countries are periodically subject.

In California the matter of sugar production was taken in hand at an early period; and considering the climates at command

within the State, it is perhaps a little strange that the first thought and attempt should have been in the direction of the manufacture of beet sugar instead of the cultivation of the sugar cane.

That, in general, sugar beets of unusually high quality can be successfully grown in many regions of California, has now been sufficiently proved by the tests made up to this time, as well as by the practical working of the manufacturing establishments that have been managed with a reasonable degree of business tact and technical skill. That the probable production of beet sugar depends on a great many conditions besides that of the quality of the raw material, is too well known to need discussion. The beets will not bear transportation to any distance, and in order to render them available for sugar-making, their successful growing must, within a limited area, be coupled with cheap fuel, good and abundant water supply, and reasonably cheap and reliable labour.

It has often been attempted to free this industry from some of these restraints, by rendering the beets transportable and capable of being kept all the year, by *drying*. But to do this by artificial heat is so costly an operation, that it can be made to pay only under peculiar circumstances; hence, as a matter of fact, this expedient has been thus far but little resorted to.

The dry summer climate of the interior of California, however, seems to offer exceptional facilities in this direction; for where *raisins* can be made successfully, cut beets can be dried without artificial heat. So far, no raisin-making country has attempted the beet sugar manufacture; hence the conditions offered here are entirely new.

The experiments made in beet-drying in the open air in Southern California during the past season have demonstrated that beets cut crosswise into slices half an inch thick, can be reduced to about one-fifth of their original weight in the course of forty hours. The resulting material for sugar manufacture, containing from 50 to 64 per cent. of sugar, will of course keep indefinitely, and bear transportation to any reasonable distance. Moreover, when extracted by the maceration process, not only is the resulting juice much purer than when obtained from the fresh beet by grating and

pressure, but it can be obtained in so concentrated a form as to diminish materially the cost of evaporation, and the dimensions and cost of the appliances required; while an increased nett outcome of cane sugar from a given weight of fresh beets can hardly fail to be secured.

It thus appears that exceptional climatic conditions, combined with an exceptionally high average quality of the beetroot, concurrently tend here to place this industry more nearly on a level with that of the production of sugar from the naturally richer and purer juice of the sugar-cane; while as regards sorghum, the only material advantage remaining would be the direct availability of the syrups for the market, beet molasses being unmerchantable save in the form of alcohol. In the tests made of the sorghums (amber cane), grown on the experimental grounds of the State University, the total sugar percentage in the juice was found to be 15, or about the same as that of the better class of sugar beets grown near the Isleton Sugarie, according to the tests previously made at the university. But of these 15 per cent. of sugar, only 10 was found to be cane sugar, and of this amount not over six could practically be extracted in presence of so large an amount of syrup, or, to give figures, the "purity-coefficient" or *relative* percentage of cane-sugar in the sorghum juice was only 68, while that of beet juice of similar sugar percentage was over 90. It is true that in other localities the cane sugar percentage of the amber cane may be found higher; but as the matter now stands, it seems very questionable whether for large-scale manufacture, the sorghum could hold its own against the exceptionally favoured sugar beet of California.

For small-scale production for home consumption, of course the sorghum is by far preferable to the beet; since its utilization requires no complex apparatus or difficult technical operations. A very primitive home-made roller press or crushing mill, such as were constructed by the negroes at the South during the war, and the common farm kettle will enable the small farmer to make his own supply of syrup and even of coarse brown sugar. According to the results of a late investigation at the university, the use of the amber-cane for this purpose would be more advantageous than that

of the water-melon, as it produces a brighter and more presentable syrup. The more perfect arrangement of an "evaporator," such as can now be bought at small cost, would readily enable a farmer to supply his neighbourhood with the best of syrup at a small cost, and with considerable profit to himself.

While the amber cane will doubtless succeed on the whole coast, from San Diego to Oregon, the sugar-cane proper is probably not available for large-scale culture, much north of Fresno. Even this, however, it would appear to be a formidable competitor of the beet, just in the region where, as before remarked, the beet-sugar industry would enjoy its greatest advantages. Experiments to be made during the coming season will enable us better to judge of the probable success of the sugar-cane culture north of the Sierra San Fernando; while south of it, its successful growth and good quality has passed beyond the province of conjecture. The question is there reduced simply to one of commercial circumstances.

The advantages of the sugar-cane over the beet may be thus summed up: The juice is nearly twice as rich, on an average, and very much purer; its syrup is a high-priced article of commerce, while that of the beet, as before remarked, is merchantable only in the shape of alcohol. The production of sugar from cane, therefore, requires only very simple appliances, such as can be procured at a moderate cost by any large grower, and managed by intelligent overseers, after a little experience.

This would indeed seem an overwhelming array of advantages on the side of the sugar-cane; and yet the beet has its offsets even to these, in the present case. The sugar-cane harvest falls within a short period, of from eight to ten weeks, during which the planter is overwhelmingly busy, and has to pay high prices for labour; for his cane, if left standing in the field, rapidly deteriorates. He is therefore under the necessity of providing much more ample appliances for boiling than corresponds to the amount of sugar produced; and, in the rush, it is difficult for him to avail himself of all the advantages offered by the superiority of his raw material. At least, this has been the case heretofore, not only in the "colonies," but also in a great measure in Louisiana. The

juice is but very imperfectly extracted from the cane ; and the actual sugar per centage obtained from the cane is partly on that account, and partly because of hasty boiling in imperfect apparatus, oftentimes no greater than that obtained from well-managed beets. It is true that this *can* be managed differently ; but as a matter of fact, from various causes, it is done but rarely. Perhaps the most perfect appliances on the large scale are those in use on the large sugar-cane estates in the Sandwich Islands ; but here there is the exceptional circumstance, that in that balmy clime, the cane matures at all seasons of the year, according to the time at which it has been planted. This removes the whole disadvantage of the "rush" and enables the planter to use his sugar-house all the year round. Hence he can afford to invest a larger amount of capital in perfecting appliances, just as is the case with the beet-sugar manufacturer who can work on dried material all the year, instead of letting his capital invested in machinery lie idle during six months, as in most of the beet-sugar growing countries at the present time. In most of these, the beet-sugar industry has required some protection by tariff regulations ; and when the Hawaiian treaty admitting the sugars of that kingdom free of duty to the United States, was first proposed, it was predicted that it would be the death of the beet-sugar industry in America. Yet since that time, new factories have come into successful operation, while others that had laid dormant have been revived, by business men credited with at least an ordinary amount of clearheadedness.

The question is certainly a complex one, and it will require some years of actual trial to determine which of the several sugar-yielding crops will yield the highest profits in California. It can certainly not be solved by acrimonious discussion, nor is there any justification, in the conditions of the question, for improving the motives of any of those holding adverse opinions. As in all similar cases, the conflict of opinions will be of advantage in determining as soon as possible, by experiment, the fundamental facts ; and whatever individuals may gain or lose, the ultimate result can hardly be doubtful, viz., that from an *importer* of sugar, California, will before very long become an *exporter* of this important article of food.—*San Francisco Journal of Commerce.*

DEMERARA.

The planters are waiting with considerable anxiety the decision of Congress as to the sugar duties, for, on the nature of the next customs' tariff will depend whether our trade in sugar with the States is to continue or cease. Under the existing tariff (until it was modified by a recent irregular order issued by the Treasury) sugar was classified in the custom house for its rate of duty by colour only, and it was quite in accordance with modern commercial tactics that the American refiners should take as much advantage of this classification as its incompleteness rendered possible. They sent here and arranged with our planters to make vacuum pan sugar of high saccharine richness but of a "low" colour; and simply by allowing the dirt to remain in the juice and abstaining from any attempt at defecation, the planters produced a sugar polarising 95° and upwards, but of so dark a colour that it was admitted into the States at a low rate of duty. Once in, the refiners had only to wash it, to render it fit to be exported as a high class sugar, entitled to a much higher drawback than the amount of duty paid on it when it was introduced. When this "black sugar" trade came to be understood, the customs' authorities in the States rushed to the conclusion that the sugars were being artificially coloured here, and on that assumption they seized some cargoes in Baltimore and New York, and laid a charge of fraud against the importers. The Baltimore case came on in due course, before a jury, and the importers were declared innocent of all fraud, but the jury held to the belief that the sugar had been artificially coloured unknown to the importers. The rider of the verdict was not in accordance with the report of the men accredited to this colony by the United States to inspect the manufacture of the sugar in question, and who had had the amplest opportunities afforded them by the planter to follow the process from the cane-carrier to the vacuum pan. Threetimes, "black sugar" commissioners have investigated the manufacture, and on each occasion the report has been unreservedly in favour of the planters. It is rather surprising, therefore, in the face of these results to learn by a telegram received to-day from the

States and published in another column, that an agent of the United States Treasury has declared his ability to produce a letter from Sir Michael Hicks Beach, "which contains admissions from Demerara as to the correctness of the Treasury's view on the subject of the artificial colouring of sugar." The general opinion here is that the Treasury agent has committed himself to a statement, which he will find impossible to substantiate. The Secretary of State for the Colonies has recently had submitted to him a report from a Commission of local officials, appointed at the instance of the United States Government, to report upon the dark sugar manufacture, and though the report was not made public here, it is well known that it completely exculpates the planters from all attempt at fraud or unfair artifice. The darkness of the quality of sugar in dispute is due not to artificial colouring, but to the total absence of artificial defecation, or of any attempt whatsoever to cleanse the juice from its impurities during the process of boiling; and the importers hold that they were justified in availing themselves of the opportunity offered by the United States Customs tariff to introduce this nature-coloured sugar, and making a legitimate profit by exporting it after it had passed through their machinery. The framing of an equitable and more scientific sugar tariff will be the best way of terminating these dark sugar disputes.—*Royal Gazette*.

The *West Indian*, referring to the above letter, makes the following observations :—

It is a curious illustration of the mode of levying the duty on sugar, and the trickery resorted to for the purpose of evasion ; and, in regard to the Colonial producer, how he is constrained to make an inferior sugar, to obtain admittance in the foreign markets. Yet in the face of this, he is charged by the *Produce Markets' Review*, and other organs in the interest of the beet-root manufacturers, with neglecting the methods in use for the improvement of the quality of the sugar.

THE LIBERAL WHIP DECLARES FOR A
COUNTERVAILING DUTY.

A large and enthusiastic meeting in connection with this question was held at Livingston on the 20th ult. Delegates from Greenock and Glasgow were present, and in supporting the resolutions which were submitted, entered at length into the injurious effects of the bounties upon the trade of this country. The resolutions condemned the system, and pledged the meeting to support those candidates who would vote for a countervailing duty to intercept the bounties.

Another meeting was held at night in Edinburgh, and arrangements were made for the purpose of securing an interview with Mr. Gladstone at an early date. It was also agreed that, seeing the Right Hon. W. P. Adam, M.P., was to address his constituents at Dollar on Monday, a deputation should at once proceed there and get an interview with him. Accordingly the following members of the various committees, viz., Messrs. John M'Kellar and John M'Lean, Greenock; Messrs. John Howie and M'Nair, Glasgow; and Mr. Wm. Leslie, who represented the working men of Alloa, waited upon Mr. Adam, and were introduced to him by Mr. Laing, his agent. The deputation stated the object of their mission, and asked if, in the event of the Liberal party being returned to power, he would support a measure for stopping these bounties by means of a countervailing duty.

Mr. Adam stated that the Liberal party would always uphold free trade.

It was pointed out to the right hon. gentleman that free trade could not exist in sugar when bounties were allowed to operate injuriously upon the British markets, and that the working men of this country desired nothing but free trade pure and simple—that was, to open our ports free to all comers, provided they left all State aid behind them, and enter the British market upon equal terms with the home refiner and compete under natural advantages.

Mr. Adam replied that what they wanted was perfectly just and fair, and neither reciprocity nor protection; and when the Select Committee gave in their report, the whole question would be brought before Parliament. And as treaty negotiations had failed

to accomplish this end, he would, in the interest of free trade and that of the people of this country, support a measure having for its object the abolition of these bounties by means of a countervailing duty, which would restore free trade in the sugar industry, and would allow everyone to compete upon equal terms.

The deputation then thanked Mr. Adam very kindly and retired.—
Greenock Telegraph, 23rd March, 1880.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

815. WILLIAM MORGAN BROWN, of 38, Southampton Buildings, London. *Improvements in apparatus for moulding sugar.* (A communication from Charles Henry Hersey, Francis Coney Hersey, and Dudley Pray, of Boston, Massachusetts, U.S.A.)

861. WILLIAM SPENCE, of 8, Quality Court, Chancery Lane, Middlesex. *Improvements in the method of refining saccharine vegetable juice, muscovy sugar, and syrups.* (A communication from Anton Gawalowski, of Trebitsch, Moravia, Austria, and Franz Teichman, of Wagstadt, Silesia, Austria.)

1068. RUDOLPH SCHOMBURG, of Plauen, near Dresden, Germany. *Improvements in apparatus and materials for filtering liquids.*

1088. FRANCIS GEORGE HARVEY, of Hill Side, Vere, Jamaica. *Improvements in the mode or method of treating cane juice, saccharine, and other solutions or liquids, for evaporating and concentrating purposes, and in apparatus for the same.*

ABRIDGMENTS.

1995 (1879). CASIMIRO DE LA MUELA, of Almeria, Spain. *Machinery or apparatus for extracting the juice from the sugar cane.* (A communication from Arturo de la Muela, of Havanna, Cuba.) The sugar cane is first sawed up, and then pressed to extract the juice. The sawing apparatus into which the cane is fed consists of a cylinder, covered with circular saws set about four millimetres apart from each other, and revolving in a suitable casing, which is fitted with a plate or comb to regulate the size and quantity of the sawdust to be delivered from the apparatus. The saw-dust is conveyed by a series of conductors to the pressing apparatus. This consists of three vertical cylinders, mounted on a circular platform which revolves on a vertical pivot, and presents successively each of the cylinders filled with the sawdust to be pressed to a piston which fits therein; and is caused to

descend at the proper moment by means of an eccentric on a shaft above. Each cylinder, as it comes beneath the piston, stops, the piston descends, expresses the juice from the sawdust, and rises to allow the cylinder to pass on and another to replace it. The bottom of the cylinder is then caused to rise therein and push up the ligneous substance remaining to the top of the cylinder, whence it is pushed off as it revolves, and the bottom of the cylinder falls back to its normal position.

4294 (1879). WILLIAM ROBERT LAKE, of Southampton Buildings, London. *Improvements in centrifugal machines, chiefly designed for use in the manufacture of sugar.* (A communication from E. E. Quimby, of Orange, New Jersey, U.S.A.) The specification comprises those inventions described among the American specifications in January, and in this list as assigned to the Matthiessen & Wiechers Sugar Refining Company.

2951. EDMUND EDWARDS, of 40, Southampton Buildings, Middlesex. *Improvements in apparatus for evaporating water or other fluids, or for drying substances containing water.* (A communication from Edouard Reyer, of Vienna, Austria.) This invention consists in a furnace provided with a heating flue and an evaporating space running spirally round a central hot air flue; the evaporating space or tunnel is placed over and runs parallel with the heating flue. The fluid is admitted into the evaporating space at the top of the spiral tunnel and flows slowly down therein, the spiral form of the heating flue providing heating surface beneath, while the central hot air flue heats the evaporating space on one side, and a hot air jacket round the whole heats it on the other side. Air holes on either side of the evaporating tunnel put the hot air jacket into communication with the central flue, thus ventilating the evaporating tunnel and allowing the vapours generated therein to escape.

3077. ERNEST DE PASS, of 68, Fleet Street, London. *A new or improved process of application of bisulphate of lime and other pure alkaline sulphites and bisulphites for decolourizing, manufacturing, and improving sugar made from beet-root, cane, sorghum, and other saccharine matters, and from glucose.* (A communication from Antoine Labarre, of Paris, France.) This specification describes three operations, the first of which is as follows: A solution of bisulphate of lime, free from hydrochloric and sulphuric acids, having been prepared and concentrated as much as possible, it is mixed with the cane, beet-root, sorghum, or the like, during the crushing or rasping operations, in the proportion of about 1 pint and $\frac{3}{4}$ to 220 gallons of juice. After the first pressure the bagasse may be used as fuel or for distillation, but it still contains some saccharine matters; to obtain which it is placed in bags, into which water is admitted, and about $1\frac{3}{4}$ or $3\frac{1}{2}$ pints of bisulphite of lime is added. This mixture is effected in a cold state, and a jet of steam is then admitted to heat the mass and help dissolution. The bagasse is then again

passed through the mill, and the liquid obtained is mixed with the fluid from the bacs, and the whole mixed with the juices first obtained. The products should be immediately limed. Second operation: After carbonation, a certain proportion or dose of bisulphite of lime is added to prevent fermentation of the juices and oxidation of the colouring matter they contain. The third operation consists in adding a certain proportion of bisulphite of lime to the concentrated juices by the treble effect apparatus (for example, 22 gallons of bisulphite of lime may be added to 6160 gallons of concentrated juice at 18° B.) The juices from the treble effect apparatus are led into bacs, heated by steam. The bisulphite of lime is added and the mass well mixed, and then heated to boiling point, and the scum, if any forms, removed. The juices thus treated are then filtered through animal charcoal, or otherwise, and then again evaporated in the apparatus where the granulation is effected and then turbined.

AUSTRIAN.

Patents issued during October, 1879.

- 3101. B. F. GROSS, of Modran, near Prague. *An apparatus for preventing the choking or dislocation of sieves in diffusion vessels for sugar works.*
- 3166. A. LEONHARD, of Lobositz. *A diffuser for sugar works.*
- 3186. G. F. MEYER, of Holzminden (Brunswick). *Filtering beet-juice in sugar works.*
- 3270. C. SCHEIBLER, of Berlin. *Lixiviating sugar and apparatus for lixiviation in general.*

BELGIAN.

- 50005. SELWIG and LANGE. *Constructing kennels in the plates of filter-presses for the supply or discharge of liquids.*
- 50101. A. HELAERS, of Braine-la-comte-Soignies. *Manufacturing a cotton hose for filtering sugar-juice.*
- 50225. C. HERBST. *A duplex beet-cutter.*
- 50272. E. ERNST. *Obtaining manure from the residues of molasses.*
- 50304. O. C. PEDERSEN and G. EICKHOFF. *An automatic centrifugal apparatus with float valves.*
- 50324. A. L. G. DEHNE. *Using automatic steam-pumps for feeding filter-presses in the manufacture of sugar.*
- 50366. J. M. O. TAMIN. *Clarifying and refining sugar juice, syrup, and molasses.*
- 50443. S. LOBRY. *Working hydraulic presses in sugar works.*
- 50495. P. CALLIBURCES. *A pneumatic evaporator.*
- 50528. E. ERNST. *Manufacturing manure of the residue of molasses.*
- 50587. A. BAZECQ. *A sugar rasp.*
- 50604. E. A. J. CHARLES. *A levigator for exhausting the soluble bodies contained in beet and sugar cane cuttings.*

COLONIAL (NEW SOUTH WALES).

ROBERT TOOTH. *Improvements in treating the juice of the sugar cane, and in manufacturing sugar therefrom.*

ROBERT TOOTH. *Improvements in the mode of and apparatus for manufacturing sugar.*

FRENCH.

132371. LANGEN. *Decolouring in turbines.*

132386. PZILLAS. *An apparatus and process for compressing wet sugar of hydro-extractors.*

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132413. LARGILLIERE. *A turbine with continuous in and out-let.*

132611. DE LOYNES. *A beet pulp stainer, with a compound alternate revolving and rectilinear motion.*

132624. MALLIAR-LAMBLOT. *A lixiviator for beet raspings.*

132663. ROLAND and CAMBRON, of Lille. *Cloth for filter presses.*

132673. MOREAU. *Apparatus with a double and triple action for preventing waste in sugar works.*

132701. BARBET. *A machine for washing bone-black.*

132712. LICHT. *Filtering beet juice in sugar works.*

CERTIFICATES OF ADDITION.

128918. GIGOT. *A galvanic rasp for beetroot, potatoes, &c.*

128951. DEMILLY. *Clarifying.*

GERMAN.

8005. A. L. G. DEHNE, of Halle-on-the-Saale. *An apparatus in filter-presses for the complete lixiviation of pressed cakes.*

9005. J. R. GIGOT, of Paris. *A filter-press with a revolving hose-like press-cloth.*

9248. A. MÜLLER, of Berlin. *Obtaining metal plush for press filters.*

9316. F. GOLLER & F. WASGEDSTICHAN, of Königsfeld, near Brünn. *A beetroot cutter for obtaining zig-zag cuttings.*

9366. F. GOLLER & F. WASGEDSTICHAN, of Königsfeld, near Brünn. *Improvements in their beetroot cutter for obtaining zig-zag cuttings.*

9459. E. LANGEN, of Cologne-on-the-Rhine. *An apparatus for claying sugar in turbines by means of cleare.*

AMERICAN.

223525. FRANZ O. MATTHIESSEN, of Irvington, New York, and EDWARD E. QUIMBY, of New Jersey, Assignors to F. O. Matthiessen and Wiechers Sugar Refining Company of Jersey City, New Jersey. *Centrifugal liquoring apparatus.* The object of this invention is to prevent the white liquor from escaping from the central reservoir of a centrifugal liquoring apparatus otherwise than through the moulds, and the invention consists in providing the central reservoir with horizontal radial spouts, and in connecting the

liquoring boxes thereto by telescopic joints, each liquoring box being provided upon its inner vertical wall with a horizontally projecting tube, which loosely surrounds one of the spouts from the central chamber. Each box may be provided with roller beneath to enable it to be moved more easily by the centrifugal force.

223537. EDWARD E. QUIMBY, of Orange, Assignor to F. O. Matthiessen and Wiechers Sugar Refining Company of Jersey City, New Jersey. *Centrifugal liquoring apparatus.* Instead of providing a telescopic connection beneath the central reservoir and each liquoring box, as in the preceding invention, they are connected by a flexible tube, which yields to the centrifugal force, and, when the machine ceases to rotate, contracts and releases the mould.

223538. EDWARD E. QUIMBY, of Orange, Assignor to F. O. Matthiessen and Wiechers Sugar Refining Company. *Apparatus for liquoring hard sugar in centrifugal machines.* This invention relates especially to the mode of governing the movement of the liquoring boxes, and consists in connecting each box by a link to a fixed hub at the centre of the machine. A spring is provided in the floor of the basket beneath each, tending to throw the same upward, and thus to withdraw it from the sugar mould. The latter rests upon a projecting from the bottom of the liquoring box, and the weight of the sugar serves to partially overcome the spring. In its downward movement the box springs forward by reason of its connection with the hub, and the centrifugal force, which completely overcomes the lifting spring compresses the edge of the box tightly against that of the mould.

223539. EDWARD E. QUIMBY, of Orange, Assignor to F. O. Matthiessen and Wiechers Sugar Refining Company. *Centrifugal liquoring apparatus.* This invention consists in so hinging the liquoring boxes to a fixed part of the basket that the effect of the rotation of the machine is to cause them to swing outward, and make their outer open faces bear firmly against the inner open faces of the sugar mould.

RE-ISSUE.

9045. JOHN M. LESCALLE, of Paincourtville, Louisiana. *Apparatus for bleaching cane-juice.* This invention consists of a series of revolving distributors, upon which the liquid falls, and by which it is scattered in an air-tight chamber, which is provided with an opening at the top to admit the liquid and an opening below to admit the bleaching gas, which ascends through the spray of cane-juice and passes off through a suitable pipe at the top of the chamber. Between each of the distributors is a fixed shelf, which still further breaks up the cane-juice. Also, the distributors are spirally arranged on the axis, so as to cause a draught when revolving, and draw in the sulphurous acid gas, thus accelerating its movement, which is very slow, as the gas is about two and a half times heavier than air.

224,674. RAPHAEL FREMAUX, of Paris, France. *Centrifugal sugar machine.* This invention relates to turbines for draining sugar previous to exposing the same to centrifugal action in the segments or forms. The drum in which the sugar is placed is formed like a ring, the inner and outer walls of which are double, and the two parts which form each of these walls are separated by a narrow space. The two parts forming the outer walls being both perforated (the inner more finely than the outer), and of those forming the inner wall the outer part is perforated, and the inner provided with a few openings near the bottom which is solid. The top of this annular space is tightly bolted on when the sugar has been filled in. The shell of the apparatus is provided with a suitable drain and outlet for the escape of the water below the drum. Steam is admitted to the turbines and passes down an annular space to the openings near the bottom of the inner part of the inner wall, suitable arrangements being made for the escape of any water of condensation. The steam passing into the cavity of the inner wall passes through the sugar, and being admitted at the bottom the first layer is not hardened too soon. The whole apparatus is closed in. Upon removing the cover of the drum the inner wall is so constructed as to be removable, when the drum presents its ordinary appearance.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To MARCH 13TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	68 ..	47	62 ..	52	68 ..	50
Liverpool ..	47 ..	38	47 ..	61	44 ..	47
Bristol	3 ..	3	10 ..	12	9 ..	10
Clyde	25 ..	35	37 ..	53	44 ..	50
Total ..	143	123	156	178	165	157
Increase..	20		Decrease..	22	Increase..	8

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST FEB., FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
145	165	31	110	4	455	466	473

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST FEB., IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
956	309	32	297	184	1778	1777	1779

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	270,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	385,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland ..	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	60,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,375,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

In the early part of the month Refiners showed more inclination to buy raw sugar, and they not only bought more freely of West India, but also competed with the Grocers for crystallized Demerara.

Towards the middle and end of the month the excitement of the General Election, as well as the Easter Holidays, interfered with business and the demand for sugar consequently fell off.

The imports in 1880 compared with those in 1879 show a decrease of 21,600 tons against a decrease of 21,000 tons shown last month.

The deliveries which last month showed an increase of 9,100 tons, now exceed those of last year by only 7,800 tons.

The stocks of sugar on the 13th March were 19,900 tons in excess of those of the same date last year, and 8,800 tons less than on the 1st January, 1880.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 23s. 6d., to 24s., against 23s. to 23s. 6d.; good to fine grocery, 25s. 6d. to 27s. 6d., against 25s. 6d. to 27s. 6d.; Martinique crystals, 27s. 6d. to 28s. 6d., against 27s. 6d. to 28s. 6d.; No. 12 Havana, 26s. to 26s. 6d., against 24s. 6d. to 26s.; fair to good refining Cuba Museovados, 22s. 6d. to 23s., against 23s. to 23s. 6d.; middling to good brown Bahia, 20s. to 21s., against 20s. to 21s.; good to fine Pernambuco, 21s. to 21s. 6d., against 21s. to 22s.; Paris loaves, 28s. 6d. to 29s. 3d., against 29s. to 29s. 6d.

THE SUGAR CANE.

No. 130.

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 The writers alone are responsible for their statements.

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THE FAVOURED NATION CLAUSE.

When the sugar question comes on for debate in Parliament, the discussion will, we have no doubt, mainly turn upon our treaty obligations under the so-called favoured nation clauses. It is therefore not without interest at the present time to notice the arguments used by the Government of the United States in dealing with a difficulty arising out of the interpretation of this very clause, as far back as 1822, in connection with the treaty of 1803, for the cession by France of Louisiana to the United States.

Art. VIII. of that treaty was as follows : “A l'avenir et pour ‘toujours après l'expiration des douze années susdites les navires ‘Français seront traités sur le pied de la nation la plus favorisée ‘dans les ports ci-dessus mentionnés.”

All conditions are absent from this article. Nevertheless, conditions were claimed as of right by the United States. What the conditions were has no bearing on the principle of interpretation, upon which point alone we refer to this international dispute.

The cause of the dispute was the advantage enjoyed by Great Britain in respect of her vessels being placed upon the same footing as the vessels of the United States, whilst vessels from France were subjected to heavy tonnage duties upon entering the American ports, including those of Louisiana. The question is thus referred to in the official report of Committee of Commerce, communicated to the House of Representatives, 15th March, 1822 :—

“France. The extra duties imposed in 1817 by the French

"Government on the produce of the United States, when imported into France in vessels of the United States, have excluded them from a competition with French vessels carrying American produce to France. Feeling the injustice of such impositions on the part of France, the merchants memorialised Congress. On consideration of their complaints, an Act passed the 15th May, 1820, subjecting French vessels entering the ports of the United States to a tonnage duty of eighteen dollars a ton after the 1st July, 1820."

The facts which appear to have originated the contest may be concisely summarised thus:—The United States were under obligation to treat the ships of France upon the footing of the most favoured nation in the ports of Louisiana. It is important to notice that this treaty obligation has no conditions specified. But it would appear that at that date (1820) British vessels entering the ports, say of New Orleans, were admitted on same terms as American vessels, whilst those of France were subjected to a heavy tonnage duty. Surely upon the words of the Treaty the French could plead their right to the same treatment as British vessels in the ports of the ceded territory. It was part of the consideration for the cession. And yet the claim was disallowed by the President of the United States, and why? We will let the President state his own case as it appears in his Fifth Annual Message of 3rd December, 1821.

"It is my duty to state, as a cause of very great regret, that very serious differences have occurred in this negotiation, respecting the construction of the Eighth Article of the Treaty of 1803, by which Louisiana was ceded to the United States, and likewise, respecting the seizure of the "Apollo" in 1820, for a violation of our revenue laws. The claim of the Government of France has excited not less surprise than concern, because there does not appear to be a just foundation for it in either instance. By the Eighth Article of the Treaty referred to, it is stipulated that, after the expiration of 12 years, during which time it was provided by the Seventh or preceding Article that the vessels of France and Spain should be admitted into the

"ports of the ceded territory, without paying higher duties on
"merchandise, or tonnage on the vessels, than such as were paid by
"citizens of the United States, the ships of France should for
"ever afterwards be placed on the footing of the most favoured
"nation. By the obvious construction of this Article, it is pre-
"sumed that it was intended that no favour should be granted to any
"Power, in those ports, to which France should not be forthwith
"entitled; nor should any accommodation be allowed to another
"Power, on conditions to which she would not also be entitled on
"the same conditions. Under this construction, no favour or
"accommodation could be granted to any Power to the prejudice
"of France. By allowing the equivalent allowed by those Powers,
"she would always stand in those ports on the footing of the
"most favoured nation. But if this Article should be so construed
"as that France should enjoy, of right, and without paying the
"equivalent, all the advantages of such conditions as might be
"allowed to other Powers in return for important concessions made
"by them, then the whole character of the stipulation would be
"changed. She would not only be placed on the footing of the most
"favoured nation, but on a footing held by no other nation. She
"would enjoy all advantages allowed to them, in consideration of
"like advantages allowed to us, free from any and every condition
"whatsoever."

By the following quotation from the President's Sixth Annual Message of 3rd December, 1822, the dispute appears to have terminated in France concluding a treaty of commerce :—

"On the 24th June last a Convention of Navigation and Com-
"merce was concluded in this city between the United States and
"France, by ministers duly authorised for the purpose. The
"sanction of the Executive having been given to this Conven-
"tion under a conviction that, taking all its stipulations
"into view, it rested essentially on a basis of reciprocal and
"equal advantage, I deemed it my duty, in compliance with
"the authority vested in the Executive by the second section
"of the Act of the last session of the 6th May, concern-
"ing navigation, to suspend by proclamation, until the end

"of the next session of Congress, the operation of the Act
"entitled, 'An Act to impose a new tonnage duty on French ships
"and vessels, and for other purposes,' and to suspend likewise all
"other duties on French vessels, or the goods imported in them,
"which exceeded the duties on American vessels, and on similar
"goods imported in them."

Now in Wheaton's Elements of International Law this dispute is referred to in connection with the principle laid down by this Jurist on the "Interpretation of Treaties." The reference appears as a foot-note to the following passage in the text. "Public treaties are to be interpreted like other laws and contracts. Such is the inevitable imperfection and ambiguity of all human language that the mere words alone of any writing, literally expounded, will go a very little way towards explaining its meaning. Certain technical rules of interpretation have, therefore, been adopted by writers on ethics and public law to explain the meaning of international compacts in cases of doubt."

The note in Wheaton, by the Editor, Mr. Lawrence, does not give the views taken by the President which we have quoted, but contains the following passage from Mr. Adams' note to the French Minister, meeting his demand that orders might be issued to such effect that in future the 8th article of the Treaty of Cession should receive its entire execution, and that the advantages granted to Great Britain in all the ports of the United States might be secured to France in those of Louisiana. To that demand Mr. Adams replied that he was instructed to say "that the vessels of France are treated in the ports of Louisiana upon the footing of '*the most favoured nation*,' and that neither the English nor any other foreign nation enjoys gratuitous advantage which is not equally enjoyed by France. But English vessels, by virtue of a conditional compact, are admitted into the ports of the United States, including those of Louisiana, upon payment of the same duties as the vessels of the United States."

The sum and substance then of this historic episode, which we have detailed from official documents, amount to this: viz., that notwithstanding the absence of all conditions from the words of

the Louisiana Treaty, yet conditions were imported into its interpretation by the United States.

But only as recently as 1878, in a debate in the House of Commons upon the favoured nation clause, we find some valuable authority upon its proper interpretation.

To make the debate intelligible, as bearing upon the point we are now discussing, we must explain that the Contagious Diseases (Animals) Bill, as introduced by the Government, subjected cattle from foreign countries to compulsory slaughter, with power to the Privy Council to release the Channel Islands and the Isle of Man from restriction; and as regards Canada and America, excepted these countries from restriction until an order was made by the Privy Council with respect to these excepted countries.

American cattle would, therefore, have been free until subjected to provisions for compulsory slaughter by Order in Council. Consequently, as between foreign countries generally and America, inequality of condition would have been specifically created had the Bill become law. The inequality would have arisen from the fact that America would have been free until the Privy Council issued an order; whilst as regards other foreign countries, immunity from disease would not have freed them from restriction until an Act of Parliament was passed. The Government introduced an amendment, enabling the Privy Council to exempt Denmark, Sweden, Norway, Spain, or Portugal. Still, inequality of conditions would have remained. This inequality raised a debate on the "favoured nation clause." In the course of the debate, which we only propose to follow so far as it contains direct opinion on the favoured nation clause, Sir Henry James, who raised the question, pointed out the inequality in the provisions we have referred to, and consequent violation of the "favoured nation clause."

Sir Charles W. Dilke observed "that it would not be in the "power of the Privy Council, under this Bill, to admit French "cattle, even although France was entirely free from disease, while "it would be in the power of the Privy Council to admit the cattle "of countries that competed with France; and, therefore, with "like freedom from disease, there could not be a like principle of

"treatment applicable to all cases." Upon this inequality Sir Charles W. Dilke rested his arguments against the Bill as violating the favoured nation clauses.

The Attorney-General (Sir John Holker) said, "Now, what was "the meaning of the 'favoured nation clause'? He took it that "in whatever language that clause might be expressed—and the "language of the different treaties was not always the same—but "whatever language might be used, the real meaning was this—"You, Great Britain, shall treat us in the same way as you treat "the most favoured nation with whom you have a treaty—that "is to say, you shall treat us as well as you treat them under the "like circumstances." . . . Really and truly, then, the favoured "nation clause meant that which was expressed in the case of "Austria—namely, that neither of the high contracting Powers or "parties should establish a prohibition of importation, exportation, "or transit against the other which should not 'under like cir- "cumstances' be applicable to the third country most favoured "in this respect."

Sir William Harcourt said the Attorney-General's "whole argument was founded on the very points for which those who opposed the Bill had contended. . . . The Attorney-General had laid down the principle that in the most favoured nation clause "they must, under similar circumstances, deal with all countries alike. He (Sir William Harcourt) was not going to quarrel "with that proposition, though, if strictly interpreted, it would "be found not to be quite correct."

Referring to the bounty on loaf sugar, Sir William Harcourt said:—"They were bound to admit this sugar, under similar "circumstances, from different countries; but they had great "difficulty with France when a bonus was given by France itself "upon this sugar. They might have said the circumstances were "not similar in a country which gave a bonus on their sugar, and "therefore they would not admit it. But it would not be politic "to maintain a proposition to that extent. . . . What a nation "could claim under the 'favoured nation clause' was that there "should be an immediate power under similar circumstances to "admit it to equal rights with others."

The Solicitor-General (Sir Hardinge Giffard) observed "that 'the 'favoured nation clause' assured equality of rights to all the parties concerned, but the mistake was to say that that involved 'identity of treatment.'"

Mr. Herschell "quite agreed with the hon. and learned Solicitor-General that equality of right did not necessarily mean 'identity of treatment. But he did say that equality of right did 'mean identity of treatment under similar circumstances."

Mr. Gorst said: "Now, what we had promised to do [under our 'treaties] was, not to establish any prohibition of importation or 'transit against the produce of any country with which we had 'entered into treaties containing the 'most favoured nation clause' 'which would not under like circumstances be applicable to all 'other countries."

The Chancellor of the Exchequer said "That this country was "bound to treat all foreign nations alike—but that was, alike "under similar circumstances."

Mr. Gladstone observed that "He would say one word upon the "doctrine of similar circumstances. He did not deny that it was "a doctrine that could not utterly be excluded from discussion of "that kind. . . . Similar circumstances were very large words; "they admitted of infinite discretion in interpretation." Referring to a most favoured nation treaty, Mr. Gladstone said: "Did not "the treaty mean that there should be immediate equality? What "he concluded was that it did mean that there should be immediate equality."

It is not necessary to add to this valuable body of opinion. Sir William Harcourt and Mr. Gladstone properly qualified the doctrine of "like circumstances" from too great an extension.

The upshot of the debate was the withdrawal by the Government of all distinction between foreign countries, by subjecting all alike to provisions of compulsory slaughter, with power to the Privy Council to exempt any countries upon being satisfied as to freedom from disease.

We quite agree with Sir William Harcourt that to prohibit sugar, because it had a bounty, would not be politic. The golden mean

is to prohibit from our markets, not the sugar, but the bounty. This is effected by a countervailing duty.

The principle of the Contagious Diseases (Animals) Act of 1878, was to exclude, not cattle but, disease. To exclude the disease of protection from our markets is all that our sugar industry need contend for. It is impossible to suppose we are precluded from excluding protection by any favoured nation clause, otherwise this clause in the last Austrian treaty would render nugatory all the efforts of our Government for the abolition of bounties.

Upon the wording of the favoured nation clause, foreign countries are not prohibited from favouring their own citizens. They may give bounties. But the nation, the recipient of the bounty, is not precluded by Treaty engagement from accepting the bounty for its tax-payers instead of for its consumers, and thus "favouring" its producers by releasing them from having to compete with "bounties." Commercial treaties have regard to the ports, only as leading to the markets. It is on the markets that the provisions of commercial treaties are meant to have, and must have, their effect. Our national policy is to secure free trade competition. As regards foreign markets, we admit our inability to do more than obtain, when we can, the "most favoured nation treatment." Against protection for the national industries of foreigners on their home markets we are powerless. But we venture to say that the true spirit of our commercial treaties will be violated if, on our own home market, our national production may be harassed by foreign states claiming, under those treaties, unrestricted right of entry for their products when heavily subsidised by export bounties. Such a claim has never yet been advanced by any foreign State in the discussion of this question. Moreover, such foreign States as give bounties harass not only our own home and colonial production, but the production of other foreign States in treaty with us, who give no bounties. Indeed, in Mr. C. M. Kennedy's letter to Lord Derby, of the 21st April, 1874, we find that M. Deseilligny—the French Minister of Commerce—had stated "that "bounties avowed or disguised, granted by foreign Powers, might "be checked by a general provision of English law to impose a duty

"on refined sugar imported from foreign countries which are held "to give bounties on exportation." But Lord Derby, in replying to Mr. Kennedy's letter, stated that "Her Majesty's Government "were under treaty engagements from which they had no wish to "depart, to treat France and French produce on the most favoured "nation footing." Thus Mr. Kennedy's hands were tied, as Mr. Walpole's were subsequently, from discussing the only efficacious measure for a solution and settlement of the bounty question.

But last year, on the appointment of the Select Committee on the Sugar Industries, this view of Lord Derby's, as applicable to countervailing duties, was abandoned by the late Government, and not assented to by the House of Commons, seeing that Mr. Forster's amendment to exclude compensatory duties from the consideration of the Committee was rejected by a considerable majority, which included votes of members of the late administration. The conclusion to be drawn from the argument and authority we have adduced is obvious. Parliament is restrained by, and need await, no treaty engagements in rendering justice to the British sugar industry.

W. P. B. S.

MR. RITCHIE AND MR. GEORGE HENRY CHAMBERS ON SUGAR BOUNTIES.

On the 22nd of March last, during the exciting electoral contest for the Tower Hamlets, Mr. C. T. Ritchie, M.P., attended at a mass meeting of persons engaged in the various branches of the British sugar trade, held at Lusby's Hall, Mile-end-road, the object of the meeting, which had been organised by Mr. Kelly and other members of the Workmen's Committee for the Abolition of the Foreign Sugar Bounties, being thus announced : "To protest against any further continuance of foreign export sugar bounties—a cruel system, which has destroyed the British loaf sugar industry, and which seriously threatens our West Indian Colonies." The platform was the stage of the theatre, the side scenes of which were still standing.

The CHAIRMAN, Mr. George Henry Chambers (Chairman of the London and St. Katharine Docks Company), who upon rising was greeted with loud and continuous cheering, expressed his desire that fair play should be accorded to the large industry represented by the meeting. He did not intend to call in question the principle of free trade which had been accepted by the country ; but there had been some misunderstanding as to the meaning of free trade, and he thought, as in other things, the result to the sugar trade had been that, in grasping at the shadow, they had lost the substance. He believed that that interest had been suffering in a most unfair manner. The principle of free trade was that where production could best be carried on—there it should be carried on without hindrance ; but when they came to introduce bounties and to give an unfair advantage to any particular branch of industry, then there was no longer an equal competition, and they knew, from that which had taken place, that all the Governments of this country had seen the hardship to which the British sugar industry had been exposed. Those Governments he believed had endeavoured to do what they could in order to get that injury redressed. (Hear, hear.) They had all given up the idea that it was the duty of a Government to find work for everybody, but they had not given up the idea that when a Government found any portion of its people oppressed or injured unfairly, they ought to come to the rescue, and devise some means whereby that injury could be redressed. (Cheers.) That would be one of the subjects which would have to be dealt with by the new House of Commons, and there could be no more able person to deal with that subject than their present representative, Mr. Ritchie. (Cheers.) The last thing that he (the Chairman) should wish to propose was a tax upon the food of the people—(cheers)—but it was one thing to tax bounties, and quite another thing to tax food. (Cheers.) And when he considered into how many branches the sugar trade diverged, and also that the interest of the West India Colonies was concerned—and he hoped the day would never come when the people of England would be indifferent to their colonies—he felt that the time had arrived when something ought really to be done to remove this grievance from the sugar trade. (Loud cheers.)

Mr. C. T. RITCHIE, M.P., who was most heartily received by the immense assemblage, said that the size of the meeting showed the great interest taken by the working classes—and not only those immediately connected with the sugar refining industry, but by all sections—in the question which had called them together. The working classes of all trades of the country saw that they had a most vital interest in an adequate and proper settlement of the question. The question did not assume the prominence it now occupied until the working classes took it up; and it was because they had gone heart and soul into it that it had come into prominence. For years past the Governments of the country—whether they were Liberal or Conservative—had been endeavouring to put an end to the inequalities of the system of foreign bounties. They had, by negotiation, first with one country and then with another, endeavoured to put an end to that which was gradually ruining the sugar industry of this country and of our West Indian colonies; and, although they had been almost on the brink of success at various times, something or other had happened to send the question back again to the position which it occupied before, and nothing had yet been done. (Hear, hear.) He was interested in the question only as it affected the East of London. (Hear, hear.) There were some who thought that it was time some other step than negotiation should be taken to bring the matter to a satisfactory conclusion. He thought that the first step to take was not to propose to the House of Commons any remedy, but to ask them to appoint a Committee to enquire into what remedy could be provided. (Hear, hear.) Some persons said that it was not the bounty system which was ruining the sugar refining trade of the country, but that there were other influences at work—that there was a want of energy on the part of the sugar refiners here and the sugar cultivators in the West Indian colonies, and that that had more to do with it than the foreign bounties. They all felt that the Committee, if they did no other good, would at least explode that notion, and would show that the only thing that was ruining the industry, both here and in the West Indies, was the inequality of the foreign bounties, and that if left alone we should not only be

able to compete with any country in the world, but be able to beat them. (Hear, hear.) Notwithstanding the strenuous opposition to the Committee on the part of some theoretical free-traders in the House of Commons, the Committee was appointed, and sat for several months, and was beginning to resume its operations when Parliament was dissolved. It would be for the electors to say whether the Committee should resume its labours in the new Parliament. (Cheers.) A greater responsibility in that matter lay upon the Tower Hamlets than upon almost any other part of the kingdom. (Hear, hear.) The Tower Hamlets was not only the seat of the sugar refining trade, but was also the constituency of the man who brought the matter before the House of Commons, and who had the honour of occupying the chairmanship of that Committee. Although his tongue was to some extent tied, he could say that there were some fallacies advocated before the Committee which a little careful examination would show to be utterly futile, and one was that they desired by protection to make sugar dearer. It was not a question of protection at all. On the contrary, what they desired to do was to re-establish that free-trade which had been destroyed. (Cheers.) It was of vital importance to the country that our home markets should be kept open to us, and that they should not be extinguished by unfair competition. It was unfair that we should be prevented from producing this article cheaper than other countries because of the action of a foreign Government. (Hear, hear.) It was unfair that they should allow any foreign Government to say to us, "We will not allow you to carry on this or that industry in your midst"—for that was what it amounted to practically. (Cheers.) They had been told that the effect of a countervailing duty would be to make sugar dearer. He wanted to know what would have been the effect of the negotiations had they succeeded in stopping the bounty? It would have had exactly the same effect as putting on a countervailing duty; it would simply allow the sugar to be manufactured at its own natural producing price, and it could not be for the ultimate benefit of the consumer himself that he should be able to buy goods below the lowest price at which they could be produced. The

effect of that would be to drive away all British manufacturers and capitalists out of the trade, and by so doing the price would be increased. If everything we produced here were sent to us laden with a bounty enabling the manufacturers of other countries to sell it 50 per cent. below the price of our manufacturers, our manufactures would be destroyed, and where then would the working classes receive employment? (Cheers). And if they did not receive employment, where would they receive the wages to buy the articles sent to them even at 50 per cent. below the market price? (Cheers.) They might rely upon it that the best course to adopt would be to allow all manufacturers throughout the world to compete with us upon equal fiscal terms. That was free-trade. That the sugar bounties should be done away with was not only of importance to those employed in the sugar refining interest in this country, but it was of immense importance to our colonies in the West Indies. The colonists were British subjects, and their interests ought to be as dear to us as the interests of any of our subjects at home. (Cheers.) Therefore, for every reason, he considered that they were justified in going on in the course they had commenced, and that they should not relax their efforts until they had convinced their opponents—or at least convinced the executive Government—that their duty was not to protect our industries, but to secure for them fair play; and he was sure that if the working classes continued on with the question as they had begun, it could only end in one way, and that was in its complete and entire success. (Loud cheers.)

Messrs. MONTEITH and KELLY moved and seconded, in effective speeches, resolutions voting thanks to Mr. Ritchie for his efforts on behalf of the British sugar industry, and pledging the meeting to use their efforts to secure his return at the head of the poll at the coming election.

Mr. RITCHIE briefly replied to the resolution, which was carried, and a vote of thanks to the Chairman for presiding concluded the proceedings, which, in spite of the thousands present, including numerous supporters of Professor Bryce, the Liberal candidate, were most orderly throughout.

Another great meeting in support of the Conservative candidate, Mr. Ritchie, was held during the electoral contest in the Tower Hamlets, also under the presidency of Mr. George Henry Chambers, which was attended in large numbers by dock labourers and others affected by the export bounty system, and resolutions condemning this protectionist device, and in support of Mr. Ritchie, as the tried champion of the British sugar industry, were carried. During this electoral contest Mr. Monteith delivered many effective speeches in behalf of the West Indian sugar industry, with the prosperity of which his Trade Society of Coopers is largely interested in East London.

THE ANTI-SUGAR BOUNTY QUESTION AND THE GENERAL ELECTION.

The dissolution of Parliament, although somewhat precipitate and unlooked for at such an early stage of the last session of the old, expiring Administration, nevertheless found the various branches of the Workmen's National Executive Committee for the Abolition of the Foreign Sugar Bounties fully prepared—in all parts of the country—to meet this contingency, and to widely ventilate the universally admitted grievance of the foreign export bounties, and to demand from candidates pledges in favour of a speedy and satisfactory settlement of the question in the first session of the new Parliament. Previous to taking any action in the constituencies, the Executive Committee convened a special meeting of the whole of the delegates representing every branch of trade and labour dependent for employment upon the home and colonial sugar industry. The Conference accordingly took place at the Cooper's Hall, Commercial Road, London, E., under the presidency of Mr. John Monteith, upon March 17th, 1880, and was attended by a large number of representatives, which included the secretaries of the National Anti-Bounty Movement, Messrs. Peters and Kelly. The meeting lasted about four hours, and complete arrangements were made for testing the feeling of Parlia-

mentary candidates upon the question of foreign bounties and the imposition of countervailing duties. And an address, which was printed in the *Times* and nearly the whole of the newspapers of the United Kingdom, was also agreed upon by the delegates, and was subsequently distributed upon a large scale in the various great centres of commerce and industry throughout the country.

This address was quoted with approval in the House of Lords upon March 22nd by a noble duke; and the terms of the manifesto appealed to the working class electors of the United Kingdom to demand free trade competition upon British home markets for all sections of home labour, and called upon all workmen to refuse to support any aspirant for Parliamentary honours who declined to support the principle of the imposition of a countervailing customs duty, to intercept the foreign bribe or subsidy for the revenue, and not allow it to operate on the markets of Great Britain to the immense disadvantage of British capital, and the unspeakable ruin of British labour.

The publication and distribution of the Workmen's Manifesto found the Auxiliary Associations, in all parts of the country, in full and enthusiastic work. The London Executive Committee set to work, under the energetic leadership of Messrs. Kelly, Monteith and Jack, to organize and to test public feeling in the Metropolitan electoral districts, where direct interest in the cause of justice to the British sugar industry strongly existed. Accordingly the London Executive limited their operations to the City, Tower Hamlets, Southwark, Lambeth, and Hackney. And deputations of representative workmen from the various Trades Associations waited upon the candidates seeking the suffrages of the electors in these important constituencies, with gratifying success and satisfaction, excepting so far as Professor Fawcett, member for Hackney, is concerned. It may not be out of place in the columns of the *Sugar Cane* to give a brief *résumé* of the answers of candidates in the London boroughs to the pointed interrogations of the workmen's delegates as to the views held by candidates upon the foreign export bounties, and the principle of imposing countervailing duties.

The Right Hon. J. G. Hubbard, M.P., (at Houndsditch), speaking for himself and colleagues, (who were then engaged contesting the representation of the city of London in the Conservative interest,) described the foreign bounties on sugar exports as a disgraceful violation of common honesty upon the part of continental nations, who viewed with anger and jealousy the superior natural advantages which England possessed in her West Indian colonies for the production of sugar. Mr. Hubbard highly praised the working men for the courage and ability they had shown in maintaining the agitation against the bounties, and declared that—speaking for himself, and he was certain it was the opinion of his friends, Mr. Alderman Fowler and Mr. Alderman Cotton, also—when the question came before the House of Commons, as to how this pernicious system of bounties was to be met, any proposal which successfully aimed at their complete suppression would have their cordial support.

The Liberal candidates for the City also denounced the bounty system, and, when questioned, at once conceded the urgent desirability of getting rid of the bounties in any practicable manner that could be named. In the borough of Southwark, where party feeling ran very high, an enthusiastic meeting of workmen engaged in various branches of the industry was held, when resolutions were voted with acclamation, pledging the assembly to withhold their vote altogether, in the event of the candidates not boldly speaking in favour of the countervailing duty. A large deputation, representing fifteen different trades of Southwark, waited by appointment upon the Liberal and Conservative candidates, at the London Bridge Hotel, and the results of the interviews were that both Messrs. Cohen and Rogers (the Liberal candidates) and Messrs. Clarke and Cattley (the Conservative candidates) unhesitatingly declared themselves favourable to the imposition of a countervailing duty, and would give it their cordial support if returned to Parliament. We may here say, in passing, that we cannot but regard with warm satisfaction that a Political Economist so eminent as Professor Thorold Rogers, M.P., should show his thorough appreciation of the principles of the past commercial policy

of this country by giving his pledge to the workmen's deputation to vote for the countervailing duty whenever it was brought before Parliament. In Lambeth, also, the replies of the candidates were favourable to an early solution of the bounty difficulty; whilst in the borough of Hackney, Mr. John Holms, M.P., warmly sympathising with the workmen suffering from the effects of the bounty system, and declaring that the system must be put an end to very speedily, his colleague in the representation, Professor Fawcett, M.P., still adhering to the worn out idea that a countervailing duty would be a tax upon the food of the people.

The learned professor was rather severely handled at the Shoreditch Town Hall, when addressing a meeting of his constituents during the recent contests, upon the bounty question. Answering a question as to whether the countervailing duty would be opposed to our free-trade system, the professor declined to answer that question, but said he could not vote for a countervailing duty upon bounty-fed sugars, as such a duty would, he thought, be a *tax upon the food of the people*. It would be difficult indeed for Professor Fawcett to prove this extraordinary assertion, that countervailing duties would tax the food of the people, *unless state bounties are food*, because it is the *bounty* and not the *food* that the industrial classes of Great Britain wishes to tax off the sugar markets of the kingdom, so that the doctrines of free trade to all, and State favour to none, should be allowed to reign supreme. We are, notwithstanding the learned professor's latest utterance on the sugar question, convinced that he will see the fallacy of supposing that a countervailing duty to neutralise a foreign bounty is a protective one in any sense of the word, and will, we venture to say, when the time arrives, be found prepared to loyally assist in breaking down this barrier of foreign aggressive protection operating on the sugar markets of this country.

In the borough of the Tower Hamlets, the contest was largely fought out upon the merits of the sugar bounty question. And a strong effort was made by several orthodox Liberals in the borough to oust the proved friend and champion of the British sugar industry, Mr. C. T. Ritchie, M.P., from the representation. The borough

of the Tower Hamlets being the centre of the sugar refining industry and in close proximity to the London and St. Katharine's Docks, East and West India Docks, &c., it is but natural to suppose that Mr. Ritchie should have a host of friends and supporters amongst the working classes, whose cause for the past two years he had unceasingly advocated with rare ability and eloquence, both in and out of Parliament. However, a decided stand was made against the chairman of the British Parliamentary Select Committee on the Sugar Industries; and Professor Bryce openly declared in a letter published in the *Times* that he came forward at the dictation of the Liberal clubs in the Tower Hamlets, not to oust Mr. Samuda, the old Liberal member, but to turn out Mr. Ritchie because he was a *Conservative* and a supporter of the Conservative Government. The sugar workmen, however, rallied around Mr. Ritchie, and night and day canvassed and spoke upon his behalf. The Central Committee, sitting at the Coopers' Hall daily, issued notices, addresses, and handbills, through the docks, sugar factories, coopers' shops, coppersmiths' works, &c., &c., and a good deal of work was done to secure the re-election of Mr. Ritchie as member for the Tower Hamlets. One of the largest mass meetings ever held in the borough took place at Lusby's Great Music Hall, Mile-end Road, and was composed almost entirely of workmen thrown out of employment through the operation of the bounties. Mr. George Henry Chambers, chairman of the London and St. Katherine's Docks Company, presided over upwards of 5000 operatives, and denounced the system of export bounties in a very able and scathing address, and called upon the meeting to return Mr. Ritchie again triumphantly to Parliament to complete the great work he had undertaken, at their—the working men's—own solicitations, to a speedy and satisfactory issue. Mr. Ritchie, who also addressed the meeting, received an ovation, and delivered a speech, in which he foreshadowed the ultimate triumph of their cause, but counselled them to be united and give him their support in fighting their battle in Parliament. At this monster meeting, which the *Standard* described as the most remarkable meeting which had taken place during the Metropolitan contests, a resolution was

unanimously voted to return Mr. Ritchie again to Parliament as champion of the sugar industries; and we are pleased to state that, notwithstanding the re-action which, from the commencement of the elections, were decidedly against the Conservative Administration, that Mr. Ritchie again is honoured by the voice of the great borough of the Tower Hamlets, and will, there is no doubt, bring the bounty question to a satisfactory termination.

The London Executive also warmly supported the candidature of Mr. Samuda, and organised large meetings in his behalf, in which his candidature was strongly recommended; but the friends of Professor Bryce, instead of injuring Mr. Ritchie's chance of success, ousted Mr. Samuda, which we much regret inasmuch as although Professor Bryce, M.P., has declared himself in favour of settling the bounty question, yet Mr. Samuda gave strong evidence of an earnest desire not to rest until the matter was settled; and more than once declared that as a free trader of forty years' standing, he would prohibit the importation of bounty-fed sugar coming to British ports altogether. In Finsbury and Greenwich the question was put to the candidates, and replies were received which clearly show that the work of educating the public mind upon this difficult question, undertaken by the Workmen's National Committee, has developed itself into an unquestioned and striking success.

In the provinces the organised Committees worked with great zeal, and much good, we are able to state, has been done. At Bradford, Mr. W. E. Forster, M.P., replying to a deputation of Bradford working men, stated that the sugar bounty question was the strongest case which had ever been presented to Parliament or the country in which the principles of free trade needed a slight relaxation,—meaning thereby the imposition of the countervailing duty; but it has been well and judiciously pointed out by the Bradford Trades Committee to the right hon. gentleman that the working classes do not desire to see free trade relaxed or interfered with in any degree whatever. What they did want was free trade in sugar, by neutralising the continental bounties and keeping them off home markets. And furthermore impressed Mr. Forster by stating that there could never exist free trade whilst foreign export bounties in any form continued.

At Leeds, through the public spirited conduct of the Leeds and District Trades Council, the candidates were all interviewed with the exception of the Right Hon. W. E. Gladstone, M.P. (who was absent in Midlothian), and the answers of Mr. Alderman Barran, M.P., and Mr. H. Jackson, M.P., were decidedly in favour of the abolition of the bounties by a speedy and efficacious measure. Mr. Alderman Barran, the senior and Liberal member for Leeds, declaring that the countervailing duty should be imposed so as to secure justice and fair play to all producers of sugar, whether British or foreign alike. And declared that as an English manufacturer himself he could not hope to sustain a competition with a foreign manufacturer which received in any form a subsidy or bounty from his Government. This declaration of Mr. Barran, M.P., contains the hearty ring of the true English free trader of the Cobden School. And we tender him our hearty thanks, as well as the thanks of the sugar operatives to the Leeds Council of Trades for the energy they have displayed in bringing the bounty question so largely prominent before the attention of the candidates for the North-West Riding of Yorkshire, and other divisions of the county; and also for their continued support and activity in the anti-bounty movement. The Liverpool Executive (which represent the two large and important trades councils of the great northern seaport,) we are pleased say, have succeeded in every electoral district they have visited in Lancashire and Cheshire in bringing the question before the attention of candidates.

Mr. A. Clark (Secretary of the General Trades Council of Liverpool), Mr. J. Cartmell (President of the Ship Joiners Association), and Mr. Peter McStay (Secretary of the Liverpool Anti-Bounty Executive Committee), were appointed as a travelling deputation by the Liverpool section, and interviewed the members for Liverpool, Birkenhead, South-West Lancashire, North-East Lancashire. And received replies from all the candidates favourable to a speedy settlement of the bounty question.

We cannot too highly praise the conduct of the Liverpool Trades Councils, both the general trades and shipping trades, for the valuable and active support they have rendered the National Movement since its commencement.

At Bristol and Plymouth influential deputations waited upon both Liberal and Conservative candidates. At Bristol the Central Executive Committee of the Anti-Bounty Association took an active part in the electoral contest, which resulted in placing Mr. Samuel Morley, M.P., at the head of the poll with a very large majority.

In consequence of Mr. Lewis Fry, M.P., declining to support the countervailing duty, a strong and determined effort was made by the sugar workmen, under the leadership of Mr. S. Peters and Mr. Hunt, to return Sir Ivor Guest, Bart., the Conservative candidate, who had declared in emphatic terms in favour of the countervailing duty. However, the contest resulted in the return of Mr. Fry to Parliament as a colleague of Mr. Samuel Morley, M.P., with a majority 900 less than Mr. Fry secured in 1878.

At Plymouth, the members for the borough, Mr. E. Bates, M.P., and Mr. P. S. Macliver, M.P., have both unhesitatingly declared in favour of suppressing the bounties by means of a countervailing duty or any other means that can be devised. At Hull, South Essex, and other places, replies of a most favourable nature have also been received, showing the great and continued progress of the movement to obtain free trade competition on British markets for the sugar industries of the world.

We cannot conclude this notice of the action taken by the workmen's committees without referring to the spirited conduct of the Scotch workmen and the great results accruing therefrom. The Scotch workmen's committees at Greenock, Glasgow, Edinburgh, Leith, Alloa, and Midlothian have much to congratulate themselves upon, when we remember that they have secured the services of such well-known liberals and free-traders as the Right Hon. W. P. Adam, M.P., Liberal Whip, Dr. Cameron, M.P., Mr. Middleton, M.P. (Glasgow), Mr. Duncan Mc.Laren, M.P., and Mr. Cowan, M.P. (Edinburgh), Mr. James Stewart, M.P. (Greenock), Mr. Russell, M.P. (Buteshire), Hon. Preston Bruce, M.P. (Fifeshire), and many other members of Parliament, strong adherents to the principle of the countervailing duty. And it is with satisfaction that we print the annexed report sent to us by the secretary of the central committee at Greenock. We cannot but believe that the

days of the bounty system are numbered, but it is still the duty of all who take an interest in the British Home and Colonial sugar industry not to relax their efforts in any way until free trade is secured upon the sugar markets of the United Kingdom both alike in the interests of the producers and consumers, and the foreign export bounties once and for ever neutralised by the free trade necessity of a countervailing duty.

Report of the Central Committee (Scottish Workmen's Society) for the Abolition of the Foreign Sugar Bounties, April 20th, 1880.

In issuing this report, on behalf of the above committee, I am happy to be able to state that although the dissolution of Parliament was somewhat unexpected, we were quite prepared for it, our various committees being in a well-organised state, which at once enabled them to begin operations. The first step taken by this committee was to make sure of the member for Greenock. This they did by passing a resolution to remain neutral till the two candidates who were contesting the seat should come before the constituency, and declare their opinions on this important question. The Conservative candidate was the first to address the electors, but during the whole of his speech he did not once refer to the sugar bounty question at all, notwithstanding the welfare of Greenock depended on a speedy settlement of the same. Mr. Stewart, Liberal candidate, next addressed the electors, and in the course of his speech dealt largely with the question, and declared in favour of a countervailing duty as a free trade measure; immediately after which a meeting of this committee was called, and a resolution passed to the effect that having heard both candidates, and Mr. Stewart having declared for a countervailing duty, and being a member of the Select Committee, we agree to support him, and use every legitimate means in our power to promote his return. Having thus made sure of Mr. Stewart, and after making arrangements for calling a meeting, getting bills printed, &c., Messrs. John McKellar and John McLean were appointed as a deputation to visit the various committees, and endeavour to secure an interview with as many candidates as possible throughout

Scotland. After communicating with the Glasgow Committee, arrangements were made for a meeting in Livingston. On Saturday, March 20th, the deputation left Greenock, and on being joined by Messrs. Howie and McNair, Glasgow, proceeded to Livingston, where a large and enthusiastic meeting was held, and resolutions passed condemning the bounty system, and pledging the meeting to support only those candidates who would vote for a measure having for its object the abolition of all bounties upon sugar entering British ports, by means of a countervailing duty. A committee was then formed to co-operate with those already in existence. The secretary of said committee, Mr. Alexander Dunlop, was instructed to write to Mr. McTaggan, Liberal candidate for Linlithgowshire, on the subject, to which the following answer was returned :—

“Clifton Hall, Ratho,

“March 29th, 1880.

“Dear Sir,—I am in receipt of yours of the 24th inst., regarding the sugar bounties. You are probably aware that a Committee was appointed in the House of Commons to enquire into this subject. They have not yet reported, and I am unwilling to commit myself to any opinion till I have heard that report. I can only say in the meantime that my sympathies are all with those engaged in the sugar trade in this country, as I regard the bounty system a gross injustice to them.—I am, yours truly,

“PETER M'TAGGAN.

“Mr. Alex. Dunlop.”

The deputation then proceeded to Edinburgh, where a meeting of the Edinburgh and Leith Committee had been arranged. The meeting was largely attended, and arrangements made for endeavouring to get an interview with Mr. Gladstone, Messrs. M'Laren and Cowen. It was also arranged that as the Right Hon. W. P. Adam, Liberal Whip, was to address a meeting on Monday, 22nd of March, that a deputation should at once proceed to Alloa and endeavour to secure an interview with that gentleman. The delegates from Glasgow and Greenock left Edinburgh on Monday morning, and arrived in Alloa; and with the assistance of the Alloa men, and one of Mr. Adam's committee, succeeded in getting

an interview with his agent, Mr. Laing, who arranged a meeting with Mr. Adam and the deputation at Dellar. Mr. Adam declared for the countervailing duty. The members of the deputation then returned home. And the Greenock Committee put forth every effort in their power in order to secure Mr. Stewart's return. Meetings of the various bodies of workmen represented on the committee were held, and each one unanimously approved of the action taken by the committee to support Mr. Stewart, and resolutions were passed pledging themselves to carry out the same. Hundreds of large bills were printed and posted up throughout the town, and thousands of handbills were circulated among the working men, and a diligent canvass commenced. The result being that Mr. Stewart was returned by an overwhelming majority—1190; thus showing that Greenock, which has always been sound in Liberal and free trade principles, clearly proved that a countervailing duty was a strictly free trade measure. Greenock having now been gained, the committee then directed their efforts to other places. Meanwhile the other committees were hard at work. The Edinburgh men secured an interview with their two Liberal candidates, and a deputation waited upon Mr. Mc.Laren, and put the question of a countervailing duty to him, whereupon he expressed himself as entirely in favour of the same. Some people, he said, were of the opinion that such was opposed to free trade; but he was certainly not of that opinion. They might have a hard battle to fight, but his mind was perfectly made up on that point. He did not consider it interfered with free trade principles at all. The deputation thanked Mr. Mc.Laren, and retired perfectly satisfied. The same night a deputation from the Edinburgh Trades Council waited upon Mr. Cowen, one of our representatives being present. The question of countervailing duties was put to him, and he quite coincided with every word that Mr. Mc.Laren had spoken on the subject. A deputation then waited upon Mr. Russell, Liberal candidate for Buteshire, and laid the whole question of the bounties before him. He expressed himself as entirely in favour of the workmen's movement, and stated he would make himself perfectly acquainted with

the question, and when it came before Parliament he would be found supporting the same. Dumbartonshire was also visited, on April 6th, with a like result. The question was brought before the candidate for North Ayrshire likewise, and a favourable answer received. The committee, encouraged by the success which had already attended their efforts, determined to extend them still further, and the deputations set about having the question brought before the candidates in Fifeshire, and succeeded in getting it placed before the Hon. Preston Bruce, Liberal candidate. He stated that he had taken an interest in the question, and would inform himself better upon the same, and when it came before Parliament he would be found supporting those leaders who had been endeavouring to get the bounties abolished. A letter was then sent from this committee to Mr. Gladstone, in which the injurious effect of the bounties was pointed out, and the injustice that was being done to the working classes of this country, and asking an interview for a deputation representing the various branches of trade engaged in the sugar industry. The following reply was received :—

“Sir,—I regret to say that my whole time and strength are more than occupied, and it is not, therefore, in my power to receive a deputation from Greenock on the sugar duties. Any statement forwarded to me will not fail to receive my attention.

“Your faithful servant,

“W. E. GLADSTONE.”

This committee then, in conjunction with the Glasgow one, who had arranged an interview with Mr. Middleton, M.P., sent a deputation to that gentleman. A letter was also sent to Mr. J. Dick Peddie, M.P. for the Kilmarnock Burghs, asking an interview with him on the question, to which the following answer was returned :—

“33, Buckingham Terrace, Edinburgh,

“14th April, 1880.

“Dear Sir,—I have been so much engaged since the election that it has not been in my power to reply sooner to your letter of the 9th instant. It would have given me much pleasure to have met a deputation with reference to the foreign sugar bounties, but

I shall be so engaged until the meeting of Parliament, with preparations for going to London, that it will not be in my power to go West to meet the deputations, and I cannot think of bringing them here. I can cordially endorse all that Mr. Gladstone has said on the subject of these bounties, and shall willingly do all in my power to have the trader and workmen engaged in the business of sugar refining, freed from the injustice which these bounties involve. I am hardly prepared, however, to support a motion for putting on a countervailing duty.

"I am, dear Sir, yours faithfully,

"J. DICK PEDDIE."

A deputation has been arranged to wait upon Mr. Alexander Mc.Donald, M.P., on Saturday, May 1st. Other members have been written to, and answers are expected in a few days.

JOHN MCLEAN, Assistant Secretary and Treasurer.

April 15th, 1880.

ON THE USE, AND THE ABUSE OF THE USE OF LIME.

Mr. J. Spencer Hollings has been pleased to open this very important subject in the pages of your valued magazine, and to refer to me and to my "process for clarifying cane-juice" by way of illustration. In his interesting criticisms that gentleman has, however, fallen into a mistake or two which I am anxious to set right as I enlarge the discussion.

Lime is useful to the sugar-boiler, as it can correct the acidity of cane-juice, and it is obnoxious when it dissolves some of the contained impurities, and unites them with contained sugar to form molasses, which is a serious loss for the owner of the estate.

Cane-juice rushes into fermentation to produce acidity immediately after it is expressed from the cane. The ferment *zymas* which is the prime mover in this destruction of sugar, is invariably among the impurities of the cane-juice, and each of its congeners aids the rapidity of its progress. This progress, if not checked, would continue so long as there remains sugar for its food. Vinegar is one of the results, and the total loss of sugar is the other.

As neither of these can be the desired result, the question occurs, how can this progress of destruction of sugar by fermentation be prevented. Hitherto the popular resource has been a generous application of lime, by reason of its dissolving power over the impurities, but unfortunately without removing them. Extravagance here must be the abuse of the use of lime.

If acidity be detected in the cane-juice, or in the syrups, this acidity has been an index to the sugar-boiler that fermentation was in operation and must be held in check. His only resource has been lime : he knows of nothing else that approaches so near to a remedy, such as it is, and he has learnt to be content with the serious loss which the use of lime involves.

I infer that Mr. Hollings is a planter of great experience, for none else could entertain this subject so freely and fully. This gentleman tells us "There can be no doubt that we want a more perfect clarificant," and proceeds to analyse my process for clarifying cane-juice, accepting for his guide a recent experiment on Plantation Zealandia, conducted to a certain extent by three gentlemen of well-known experience. Mr. H. assumes a certain report of that trial as emanating from those gentlemen, whereas two of them saw that report for the first time when they read it in the Demerara newspaper. That report is, therefore, open to question, as well in relation to accuracy as to completeness. Therefore, some of Mr. Hollings' criticisms lose their applicability. I am willing to *explain*, and to leave "*apologies*" to others. We are told of this trial of my clarifying process extending over a day and a-half. In that short time no less than twenty-three thousand two hundred gallons of cane-juice were clarified, and produced a fine grocery sugar for the London market, and worth 31s. per cwt. About this there can be no doubt.

May I ask, can there occur a question on the ability of my process to clarify cane-juice in the presence of such facts taken in their entirety? We come next to the *quantity* of this sugar product, and are met at once with Mr. Bellair's assurance that "it was not convenient" for him to ascertain the value of this very desirable factor. It is true he gives us some figures, and their incom-

pleness reminds us of the old aphorism that "half a truth is a whole falsehood." It is to be regretted that those figures have misled Mr. Hollings, and probably others also. Thus, instead of attending to my instructions to return all drainage into the pans on "copper wall," to come on with the following charge of sugar, and thus increase its quantity; or, satisfy this very natural question by evaporating the aqueous portion direct, of a given quantity; instead of doing either, he discharged the vacuum pan at his discretion, and condemned "the mother water," which was a super-saturated solution of sugar, as molasses, without one effort to ascertain if molasses were present there or not. The only excuse discoverable for those imperfect, and therefore misleading, figures is, that "it was not convenient" to obtain the true—the larger sugar product. In a word, no attempt was made to ascertain the *quantity* of sugar that my process produced. An imperfect quantity was recorded by Mr. Bellairs, sufficient to disappoint an enquirer by imparting imperfect knowledge, suggesting imperfect arguments to arrive at imperfect and consequently misleading conclusions. Owners of estates expected something better, where better was available. In point of fact, having elsewhere obtained a larger sugar product by 50 per cent. more than the lime process affords, I looked with perfect confidence to find a similar result, at least, at Zealandia. Nor will I deny myself here the exposition of results of my process, and what their teachings can afford, by SIMPLY AVOIDING THE LOSS OF SUGAR IN MOLASSES.

Thus an estate which on the old process made

2000 hds. of sugar, at £20	£40,000
And assuming cost of production, &c.	36,000
Leaves a margin of.....	£4,000

By increasing the product 25 per cent. we have

2500 hds., at £20.....	£50,000
And assuming cost, &c., at	36,000
Leaves a margin of.....	£14,000

By increasing the product 50 per cent., as elsewhere,	
we have 3000 hhd., at £20	£60,000
Cost of production	36,000
The margin rises to	£24,000

As "it was not convenient" for Mr. Bellairs to carry out my design, I may be excused if I gather a few scraps from other sources, omitting any further introduction, merely adding, that some of them will be recognised before wandering far from Demerara.

Two gentlemen with two polariscopes came where my process was in daily practice. Their impression was, that such a body of cane-juice at work all day in the tank without lime, must ferment at the expense of sugar, and my process could not prevent that loss—that is, could not clarify to prevent such fermentation. A sample of cane-juice was accordingly taken as it escaped from the mill, and another sample of clarified juice as it escaped from the tank. These two samples were submitted to each polariscope, to ascertain and determine the loss of sugar by fermentation. These sensitive instruments proved that fermentation had been there arrested—that all four results were *exactly alike for sugar*, free and uncombined.

Suppose we take a step further in the same establishment, where there is neither vacuum-pan nor centrifugals. The common or open pan practice still obtains there. The hogsheads stood on the stanchions, and were filled direct from the "coolers." A cistern below received the drainage, which accumulated until pumped into the still-room. On the occasion referred to, the pump became "dry" before the still-man was satisfied with the quantity. A man entered the underground cistern to seek for the cause of this dissatisfaction. He was surprised on finding the sides and bottom of this cistern thickly covered over with crystals of sugar, caused by the lower temperature acting on the (*SUPPOSED MOLASSES*, but in truth a) *SATURATED SOLUTION OF SUGAR*, obtained by my process.

There is yet another interesting fact which deserves to be noticed. To the liquid portion of this drainage that had reached

the still-room were added, as usual, the scummings, to be together "set up" as "wash" to ferment, in preparation for the rum still. Another difficulty now cropped up: this wash *would not ferment*. Expectation lingered several days after the usual time. *Something had evidently been done* to cause this disappointment, and I was denounced the culprit. This appeared to be the shortest way out of the dilemma. Fortunately, the resources of the manager were equal to the occasion, and now we realise another interesting fact. That gentleman sent for and obtained some scummings from pans that contained cane-juice that HAD BEEN TREATED WITH LIME AS USUAL, and as usual retained the natural ferment, for neither that lime nor continuous boiling could destroy it. It was stirred into the "wash," and soon fermentation began and progressed satisfactorily.

Once I was challenged to do what they could not do, and I rashly accepted it. To my surprise they gleaned the refused canes of a field that had been cut. Most of those canes had been thrown down from time to time by rats. The mill was a primitive affair, being two vertical stone rolls driven by a buffalo. They were over four hours getting enough cane-juice—their usual guage—for about a hundredweight of sugar. In a word, I got 50 per cent. more sugar than they had got from the best canes of same field.

I recently received a letter from a client ordering another set of apparatus, informing me that he offered particulars of his operations with my process to a local Editor, who, on comparing notes with results obtained by others, advised him not to publish them, because so few would believe it possible to exceed what they were doing; an explanation which has a large application.

Here is an instance where lime was used with my process:—"This is the first full season's work we have had with the apparatus, and very opportunely, when we had to operate upon such inferior sugar-producing canes—like so many walking sticks—as has been the rule all over this district the past season, occasioned by continuous drought. Our average density for the whole season was only 5·7° Beaumé. We crushed in all 4201 tons of cane, from which was expressed 565,920 gallons of juice and made 210 tons of sugar, or 13 oz. and nearly 11 drams per gallon of juice. We

used slightly over one hhd. of lime, or about $3\frac{1}{2}$ lbs. of lime per ton of sugar. I believe the rose tint [on litmus paper] to be essential to a good free sugar." We are told that this lime was not added until the syrup was perfectly clean.

If we want a specimen of "the abuse of the use of lime," we have but to turn to that candid confession, which told us—"I limed the syrup, copper-wall, and in fact the juice, in all its stages, and have made some sugar, but it is a nasty, dirty, grey, sticky mess," &c., &c. This lime having free access to the impurities which had been freely accumulated by my process, it—the lime—as freely dissolved those impurities and combined them together with the sugar, as might have been naturally expected, to form "the birdlime-like slime" which surprised some people, who preferred to blame my process to excuse themselves.

There is an important point here which deserves to be noticed: it occurs where we consent to differ, and differ to agree. Mr. Hollings, like other first-class sugar-boilers *on the lime principle*, is anxious to secure the alkalinity of the cane-juice and the syrups; and very properly so, for it is consistent. I confess to no such anxiety; in point of fact, I prefer a certain degree of acidity. Now, acidity is fatal to the lime process, as alkalinity is to the early stages of my process. Herein lies the great difficulty, over which sugar-boilers stumble who bring with them "old opinions" fostered in the lime school, but inapplicable to my process; therefore it requires some *explanation*, but *no "apology."* Lime is added to cane-juice or to syrup to correct acidity, and impede the fermentation which begets acidity. Thus, acidity has been accepted as one of the indications of fermentation, which destroys sugar. Therefore, the sugar-boiler keenly watches for and arrests acidity during the progress of the cane-juice through its stages of manufacture, until he realizes the crystalized sugar. He must not add too much lime, or he reduces the value of the sugar to the grocer. He must not refuse lime, when required, or he will have no sugar to sell. The most skilful sugar boiler steers between these extremes when using lime. Further: he may not use enough lime to kill or destroy the powerful ferment

which is contained in the newly-expressed cane-juice. It lives on even through all the repeated boiling on "copper wall," to disport itself ultimately in the still-room when starting fermentation in "the wash" there. So then, as this insidious ferment is always present, from first to last, always awaiting an opportunity for the destruction of sugar, it demands the most perfect vigilance to impede its progress with just sufficient lime. Therefore the skilful sugar-boiler, when acting on this lime process, prefers alkalinity to acidity, so that it may impede, if not kill, the (insignificant, as to bulk, yet truly formidable because all powerful) ubiquitous ferment which destroys sugar by simple contact, inducing fermentation, and that instantaneously.

I have no sympathy with the notion of nursing such a viper in one's bosom. It has been my self-imposed task these many years to trace out from among the varied impurities of cane-juice the functions of each of them as they became known to me, and thus discover the originator of all our discomfort and intense anxiety, **THE CAUSE OF THE LOSS OF NEARLY AS MUCH SUGAR AS IS SOLD.** To firmly grasp and enchain such a culprit became no less a duty than a pleasure, seeing such an act must contribute to the ease of the management of a sugar estate, and considerably expand the profit of its owner.

That my process can so fatally grasp this culprit, we have only to turn to the rush of those twenty-three thousand two hundred gallons of cane-juice through my process in that day and a half. It might not create astonishment if one or two of those insignificantly small atoms of ferment escaped, and in the repose of some 20 hours produced some noticeable effect. The probably imperfect tentative work of that first half day can easily account for the possible escape of those atoms of ferment; but one is not many, nor are two all the atoms of ferment in those thousands of gallons. There was no such escape on the second day.

We are told in the Report that no lime was used throughout that second day, probably because none was required. The ferments were successfully attacked immediately after the juice was expressed, and **THE LOSS OF SUGAR BY FERMENTA-**

TION WAS PREVENTED. This clarified cane-juice passes on through the remaining stages without lime, producing sugar without molasses and, therefore, a larger sugar product than where lime is employed, and the sugar purer, being uncontaminated with lime and the other impurities. Although we have an acid reaction by litmus paper with my process, yet we have no fermentation, unless indeed it be produced by design or flagrant neglect. With only commonplace arrangements in the morning, that subtle ferment is sought, found, coagulated, and precipitated in the tank, together with its congeners, to lay there incapable of fermenting, and allowing the clarified cane-juice to flow on whithersoever it may be conducted. The coagulated impurities can be drawn off at any time into a subsider, say at night, or, if necessary, at mid-day also. Here is a simplicity so complete that it appears to enjoy the contempt of lovers of the complicated.

I desire to repeat my sense of obligation to those gentlemen who conducted the legitimate experiment on Plantation Zealandia, when they decided and established the important fact that my process clarifies cane-juice without lime, to the production of a first-class sugar. Mr. Hollings' requirement is thus met, and every doubt is dispelled. "There can be no doubt," says Mr. Hollings, "that we want a more perfect clarificant [than lime], and if Mr. Gill's process gives us this, it is a valuable addition to our manufacturing appliances, and *I should like nothing better than to give it a good trial.*" May I express my unhesitating satisfaction at the probability of seeing my process in the hands of a gentleman so practical, and so free from prejudice. I therefore respectfully submit the following conditions for Mr. Hollings' consideration. That Mr. H. consents to carry out my programme *before* introducing "improvements," and will publish the factors and the results in the *Sugar Cane* for general information. Should other gentlemen desire to follow this example, it will afford me much pleasure to render every information they may require, where there is nothing complex or difficult, although original. When once arranged, nothing further is required than day beyond the flowing cane-juice. This simplicity is at once the pride and the danger of my process. The untutored can

easily abide by the instructions, whilst ease if not idleness affords the ingenious a tempting opportunity to "*improve*" what they have not learnt to understand. They are likely to bring old bottles to be filled with new wine, and so risk bottles and wine.

I can have no doubt that Mr. Hollings will have seen the absurdity of any attempt to hold me or my process responsible for those figures with which Mr. Bellairs is pleased to indicate the quantity of sugar produced or producible. It were indeed of small importance to credit *me* with the available product, or deny *me* the five hogsheads, more or less, of sugar which were contained in those sixteen thousand four hundred and nine pounds of super-saturated drainage; but it must have been very questionable policy to leave undetermined, and so withhold the information on such an easy possible source of profit from capitalists who are owners of plantations, seeing they are pressed severely by competition, and with "a possible crop of 2,000,000 tons of beet "sugar next season, which means the ruin of the colonies producing "sugar."* In a word, we have only to admit what we cannot contradict, the valuable principle, the indubitable fact, the ability of my process to repeat the clarification of cane-juice without contaminating the sugar-product with lime or anything else. All that is desirable, in reason, follows naturally as mere every-day matters of course.

May I hope to be pardoned for treating an important subject with so much familiarity.

W. EATHORNE. GILL.

45, South Hill Park, Hampstead.

BLOCKADE OF THE PORT OF CALLAO.

A telegram from Lloyd's agent at Callao, by cable from Panama, states that that port is blockaded, but vessels lying there had liberty to complete their cargoes and to sail until the 20th of April.

* See letter by Mr. James Duncan, Clyde Wharf Refinery, Victoria Docks, in last month's *Sugar Cane*.

ON SOME POINTS OF CANE SUGAR MANUFACTURE.

By DR. T. L. PHIPSON, F.C.S., &c.

Although the beet and the cane, considered as sugar yielding plants, are so opposite in many respects, yet it will be generally admitted that much which has been found advantageous in the culture and working of the former, is evidently applicable to the latter. It is true that we find the saccharose formed in the beet produced in darkness (unless indeed it can be proved to be first formed in the leaves, and then carried to the roots), whilst the sugar in the stalk of the cane seems to depend not only on the heat, but also on the light of the sun. It is true, again, that in the culture of beet for sugar the greatest advantage results from close planting, so as to obtain a large number of moderate sized roots per acre, instead of larger roots with a poorer juice; whilst with the cane it is essential, on the contrary, to plant far apart, instead of close (as was formerly practised almost everywhere), for the cane roots require plenty of space if we are to expect plenty of sugar. Then, with regard to manures, nitrogenous manures do not suit the sugar beet grower; he finds it far preferable to manure the previous crop (for instance, wheat) with these, and, at most, to give the beet a little common superphosphate; otherwise a loss of crystallisable sugar will be the usual result. With the cane, on the contrary, we must manure directly and with a due amount of nitrogen-yielding products, put together in a very careful manner, in order to ensure the largest yield of crystals. It has been no easy matter to find the best manure for the cane. But whenever we leave the field and come to the mills and boiling-houses, in other terms, when we are dealing with the expressed juice of one or the other plant, then we find that the discoveries and appliances which have been found advantageous to the sugar beet grower, may be safely turned to account by the West Indian planter.

Now it has lately come to my knowledge that a considerable saving in the process of defecation has been obtained on the continent by the addition of *minute* quantities of salicylic acid to the

juice of the beet immediately it is extracted from the roots ; and it has struck me that the same results might be obtained in our cane districts, whether the salicylic acid be added as such, or as salicylate of lime, before the usual addition of milk of lime in the ordinary process of defecation.

There can be no doubt that the experiment would be well worth making, as some beet sugar makers assert that by the aid of a very little salicylic acid, the ordinary lime defecation may be done away with. I have said a *minute* quantity, because any notable quantity left in the sugar might prove prejudicial to health. The precise quantity is difficult to name, but one-half ounce of dry salicylic acid to 500 gallons of juice would be perfectly safe from a hygienic point of view and, from the highly anti-fermentative properties of salicylic acid, would probably prove quite sufficient to prevent any alteration of the juice—even when stored for some time in tanks—if added immediately that it is expressed. With regard to any danger from inversion, weak organic acids of this description have little power, unless the solutions are boiled for some time; and then, in the case in point, the quantity is so minute that no fear need be entertained.

THE THEORY OF DIFFUSION.

(*Translated from the Journal des Fabricants de Sucre, of March 17th, 1880.*)

M. M. Elie Fleury and Ernest Lemaire are about to publish a Practical Manual of Diffusion. They give, in the introduction of their work, the history and theory of the process, and it is this last part which we publish.

Diffusion is the spontaneous mixture of two natural liquids of different densities or temperatures, and devoid of chemical action on each other; or, more precisely, it is an attractive molecular force which tends to mix fluid elements placed in juxtaposition, and then to maintain them uniformly and invariably mixed, in spite of differences of density which continually tend to separate them. (Dubrunfaut.)

If in a glass nearly full of water we carefully pour a small quantity of wine, the latter, less dense, will float; but after a sufficient time, and without any exterior cause intervening, the two liquids will penetrate each other, and the mixture will be complete and perfect.

Let us reverse the experiment: by means of a long necked funnel, let us introduce, at the lower part of a vase which contains water, coloured blue by *turnsol*, a certain quantity of sulphuric acid—a body heavier than water. The property of *turnsol*, as is known, is to redden on contact with acids. The red tint, gradually increasing, will spread in all parts of the liquid, indicating that the acid has penetrated it throughout. These are two experiments of pure diffusion. Let us pass to the particular case which has received the name of *endosmosis*.

If we separate the two diffusible liquids by a porous diaphragm, or by a vegetable or animal membrane, permeable to both, the phenomenon is equally observable.

Let us fill, as Dutrochet did, a bladder with sugared water, and plunge it into a vessel of pure water: two currents will be established,—the more rapid one proceeding from the less dense to the more dense liquid (*endosmosis*), the other, more slowly, from the more dense to the less dense liquid (*exosmosis*). And, what is remarkable, in these conditions, the mixture of the two diffusible liquids takes place with a rapidity infinitely greater than if they had been simply superposed in the order of their densities. The reason is, that the mixtures formed at the points of contact, gain, in the interior of the bladder, the higher place on account of their weaker density; in the vessel, on the contrary, they descend towards the bottom, as being heavier than the water which maintains, on each side of the membrane, a constant difference of density, very favourable to the action of the diffusion force.

M. Dubrunfaut, whose name is associated with the discovery of the *osmotic* analysis, and thereby with the great manufacturing progress resulting from its application, has superabundantly proved the identity of the diffusive and the osmotic forces. In both cases, he says, the same effects are produced, but thanks to the interven-

tion of the membrane which characterises osmosis and distinguishes it from diffusion properly so called, analysis which is impracticable in this last case, even in the laboratory, becomes equally feeble, rapid, and perfect in the workshop.

The diffusion force plays a considerable *rôle* in nature. By its mysterious intervention, animals and vegetables assimilate food to their organism, and distribute it unequally according to the laws of their unequal diffusibility. "It is thus that we are able to comprehend how the salts in the soil ascend through the fibres of the beetroot, by capillarity in the vascular tissues, to penetrate into the utricular tissues by a simple effect of endosmotic diffusion. It is thus that sugar, the secretion of which takes place in the leaves, is distributed to the same cellules, and by the same ducts. And it is thus, also, in virtue of the unequal diffusibilities of sugar and salts that the utricular tissues of beetroots are unequally provided with those products according to the place they occupy in the cellular zones." (Dubrunfaut, *L'osmose*.)

Let us now draw from these positive theoretic data some consequences which enable us to comprehend and direct industrial applications.

The flesh of the beetroot is composed of a cellular tissue which contains a colourless liquid—the juice.

If we cut a root by a line perpendicular to the axis, we shall observe concentric zones, alternately opaque and transparent. Without here entering into other details, we may say, in general, that salts are contained in the cellules of the opaque, and sugar in those of the transparent zones.

These cellules, the existence of which are revealed by the microscope, are exceedingly small,—a cube millimetre may contain 400,000 taken at the adult state. (Dubrunfaut.)

Considering each cellule as a pocket, or membranous vesicle attached to the adjoining cellules by semi-organised productions (pectine, pectose, &c.) either little or not at all diffusible, it is evident that if we plunge this assemblage of tissues, endued with associative life, into water or natural solutions, and of different concentrations, the phenomenon of diffusion will take place.

Thus considered, diffusion applied to the extraction of sugar juices from the beetroot, suggests the division of the roots into slices of convenient thickness, and their immersion in water or other liquids. Two currents, of *endosmosis* and *exosmosis*, will be immediately established between the water and the juice of the cellules,—will exercise their action gradually, and change their soluble and diffusible elements through the membranes until a condition of stable equilibrium is established between the different contiguous liquid properties.

Stammer gives the following example, which well explains the course of the process. If we recover 100 kilog. of beetroot slices containing 90 kilog. of juice, at 12 per cent. Balling, from 96 kilog. of water, we will obtain, after a certain time, 192 kilog. of juice at 6 per cent. Again, if we take 96 kilog. of 6 per cent. juice and pour it upon 100 kilog. of fresh slices, always containing a juice of 12 per cent. Balling, we shall have, on the osmose principle, a juice of 9 per cent. ; 96 kilog. of this 9 per cent. juice will give, with 100 kilog. of new slices, a juice of 10·5 at 10, and then the latter will again furnish, with 100 kilog. of beetroots, a juice of 11·25 per cent., and thus we may arrive, as far as we can see, at almost complete exhaustion.

The principle, therefore, is this:—To expose the slices of beetroot to the action of diffusion, and to replace the diffusioned juices by other juices of a less density than those which are still contained in the cellules, and to continue this operation until the slices are completely exhausted of soluble matter.

It remains for us to cite some of the laws of osmose and indicate certain conditions which vary its effects.

The explanation of the transmission of osmotic force is difficult to make intelligible in an elementary work like this. We shall, therefore, endeavour to give it as simply as possible.

According to the nature of the liquids, the membranes absorb a greater or less quantity. An ox's bladder, for example, absorbs twice its weight of water,—steeped in alcohol it remains dry. Now these diaphragms or membranes are traversed by an infinity of pores, so minute and strait that a liquid which moistens them, as

water does, cannot pass through them by simple filtration—even under pressure. This water, absorbed by the ox's bladder, amalgamates with it, resists all the efforts of an enormous pressure, and cannot be expelled but by evaporation. If this bladder, full of a diffusible liquid, is plunged into a natural liquid, or one of different concentration, there will be reciprocal attraction of the molecules of the two liquids, and they will penetrate each other if the force of diffusion developed can overcome the resistance which opposes its passage.

The better to make ourselves understood, let us return to our example, and suppose that this bladder is filled with sugared water, and that we plunge it into pure water. There will be reciprocal attraction of the molecules of water, and the molecules of sugar; the water of imbibition from the membrane, attracted by a greater force, will overcome that which retains it, will be directed towards the interior of the bladder, and will be replaced by the water which follows it. Reciprocally the molecules of sugar will traverse the pores of the membrane, but now in a smaller quantity, because their atomic volume is greater.

The juice of beetroots is a complex product, and the substances which compose it have an unequal facility for traversing the coats of the cells,—that is to say, they are unequally diffusible. Let us divide them into three classes: salts, sugars, and albuminous matters.

The osmotic action of the salts is rapid, that of the sugar slower, and that of the albuminous matters almost nil. That is intelligible, as pectose, pectine, and their derivatives, are organs in process of formation and consequently insoluble. Now, all soluble bodies are diffusible, but in different degrees; and the substances called colloids by Graham, by opposition to cristalloids—a distinction entirely fictitious—are simply chemical substances which, like the albumen of gum, does not really possess absolute solubility. In water they are in a state of mixture which simulates solubility, inasmuch as their elements can partly pass through certain paper filters, but the matter of these apparent solutions is really in the condition of solid particles, very much

divided; and it is thus that, as solids and insolubles, they cannot pass through well-constituted membranes.

In fact, the microscopic researches of Dr. J. Weisner on some emptied skins (*cosslettes*) have demonstrated that the intercellular substance and the pectose had not been carried off with the juice, and reactions worked out under the microscope always revealed the absence of salt, of sugar, and nearly all albuminoid matter.

This explains the greater organic purity of the juices of diffusion, and the greater value, also, of the dry extract of the beetroot exhausted by this system.

Without entering into the numerous particular causes which occasion variations of diffusibility, we will only say that temperature exercises considerable influence, because within certain limits, and for certain bodies, it augments the force of attraction.

(Signed) ELIE FLEURY.

BEET CROP PROSPECTS FOR 1880.

The temperature of the week in France has been variable, but, on the whole, fine and favourable; and makes ample amends for the severity of the past Winter, forming, as it does, the most striking contrast to the same period last year when snow and cold rains were so prevalent, making the land absolutely inaccessible, and sowing impossible. This year the sowing commenced with the first days of the present month, (April) and has scarcely since been interrupted, which is said to promise both weight and a high saccharine richness in the roots.

Another cause of satisfaction is that the leaves are developing rapidly, covering and thereby protecting the soil from the drying heat of the sun.

According to the bulletin of the Agricultural Society of the Pas-de-Calais, the meteorological conditions of the month of March were as follows:—

	1877.	1878.	1879.	1880.
Mean temperature....	8·30....	5·49....	5·9½....	8·9½
Intensity of light	2·7	2·8	3·5	6·1
Rain in millimeters ..	85·3	76·1	41·0	40·0
No. of days of rain ..	22	21	17	6

From Magdeburg (April 17), M. Licht reports as follows :—The variations of temperature have been very great, and in the last few days we have seen the thermometer rise to the point, altogether extraordinary of 23c. 25° Celsius, in the shade, towards mid-day. In these conditions, we need not say, vegetation has made extraordinary progress ; but on that account there is room to fear for the future, for a temperature so unusual can scarcely continue.

The sowing of beetroot is progressing everywhere in favourable conditions, even in Russia they will now be able to begin.

The increase of surface reserved for beet is confirmed, except in Belgium.

M. Achleitner reports from Vienna (April 15th) : The weather during the last week has been variable, first showery and rough, since calm and agreeable. Sowing has continued without much interruption, and appears sufficiently advanced. From other countries we receive the same news. Russia alone remains in arrear. As respects Belgium, it is thought her sowings will not be larger than last year.

VISIT OF THE MANCHESTER SCIENTIFIC STUDENTS' SOCIETY TO MESSRS. W. H. BAILEY & CO., ALBION WORKS, SALFORD, MANCHESTER.

(From the "Manchester City News," March 27th, 1880.)

On the afternoon of yesterday week upwards of seventy members of the society, including more than the usual complement of ladies, visited the Albion Works, belonging to Messrs. W. H. Bailey and Co., Salford. After receiving a printed programme of the proceedings and examining a hot air engine of ingenious construction, the members of the party entered a well-lighted room, where they were met by Councillor W. H. Bailey and his manager, Mr. Lawson, by whom the various machines were described. This apartment is a kind of store-room for the manufactured articles before they are packed and sent off to purchasers. Their number and variety are marvellous, many of them being protected by patent right. Among others may be enumerated turret clocks, water and steam

gauges, injectors, reducing and other valves of all sizes, bells, hand fire pumps and steam pumps, steam whistles—once known as “buzzers” or “American devils.” Under the latter name these whistles came into general use in mills and workshops, but the nuisance to outsiders became so great that it was, some years ago, suppressed by an act of Parliament. The whistle employed on locomotive engines is exactly the same in character, and is made here in large numbers. Steam whistles of great size are used on the Cunard and other transatlantic steamers, and are found to be extremely useful in the perennial fogs which envelope the banks of Newfoundland. A gigantic specimen was made for Professor Tyndall, and used by him in his experiments on sound at the South Foreland lighthouse. Here, too, was an elegant turnstile, one of a couple of dozen ordered for the government at Constantinople. It is difficult to imagine what use can be made of so many of these machines, unless the Sultan had recently contracted a new foreign loan, and felt like the young man who, when he came into a handsome property, immediately ordered “some more gigs.”

In the next department was seen a large but compact and elegant steam kettle and oven, for use by the workpeople in a mill at Bolton. The boring, planing, and slotting machines were then examined; also a drilling machine made by the late Richard Roberts (Sharp, Roberts and Co.,) and still doing good work; a hydraulic motor-pump, and Mr. Bailey’s patent hydraulic organ-blower—a machine which dispenses with the services of a once-important functionary. In the next room was seen the automatic machinery by which brass taps and valves are made with extraordinary precision and rapidity; also Sutcliffe’s patent reversible valve. Occupying a very small space was an electric fire-alarm apparatus, made for the Bombay cotton mills, of a character so sensitive that by merely breathing upon a thin steel bar the alarm bell was set ringing. A portable hydraulic test pump was put into operation, and in a few seconds exerted upon a thick india-rubber tube a pressure of 250 lbs. upon the square inch. In Germany and Russia the users of steam boilers are obliged by law to test them periodically each year.

A bar of cast-iron, 36 in. + 1 in. + 2 in., was placed in Mr. Bailey's patent testing machine, and by means of a lever with a self-recording weight, was broken under a pressure equal to 24 cwt.; whilst a second bar did not succumb until it was subjected to a pressure of 30 cwt. In a somewhat similar machine—made for the Royal Engineers, Chatham, and invented by Professor Thurston—metals and alloys were tested by torsion, their breaking point being shown in a diagrammatic form upon a sheet of ruled paper. In another machine, designed by Mr. Bailey for the contractors who are erecting the new Eddystone Lighthouse, was placed a small block of cement of a suitable shape and size, $1\frac{1}{2}$ in. + $1\frac{1}{2}$ in. This fragment was torn in two by a tensile strain of 1·180 lbs. In a third machine, worked by hydraulic power, cement, stones, and other building materials are subjected to a test by means of which their power of resisting a crushing force, is indicated and registered. Next, a number of turret-clocks were examined, among them one for Altringham Market, a group of apparatus for testing the lubricating qualities of oils, steam, water, and vacuum guages, pyrometers, a hydrostatic yarn tester, a reservoir recorder for the Monte Video waterworks, which registers the varying height of the water in the reservoirs; steam telegraph and models of ancient telegraphs, and lastly, a workman's check-clock, which automatically tells the hour at which he comes to work, and records so many other particulars that the human lodge and timekeeper may look upon his occupation as gone.

The lateness of the hour prevented a visit to the foundry and other departments, and there are probably few, if any, establishments in the kingdom wherein is constructed such a variety of interesting, delicate, and beautiful machines. The pleasure of the inspection was greatly heightened by the painstaking manner in which the construction and application of the different machines were explained, and at its termination a hearty vote of thanks, proposed by Mr. Joel Wainwright, and seconded by Mr. Estcourt, was given to Mr. Bailey, who is an old member of the Scientific Students' Association.

DEMERARA DARK SUGARS.

Some time ago certain Demerara sugars were seized by officers of the United States Government upon the allegation that they were artificially coloured for the purpose of evading the revenue. It is satisfactory to learn that this charge has been effectually refuted by the report of a local commission of inquiry. In order to ascertain whether there was any truth in the statement, the Commissioners, who were appointed by the Lieutenant-Governor of the colony, personally watched the manufacture of the suspected sugar on two estates in the county of Demerara. They declare that after thoroughly examining the various receivers and other receptacles used in the process, they "narrowly watched the manufacture of the sugar from juice into liquor, liquor into syrup, and syrup into sugar through its every phase." Moreover, they took the evidence on oath of all the principal persons employed in each stage of the manufacture. They came to the unanimous conclusion that the colour of the crystals in the dark sugar is mainly due to the circumstance that the lime used to temper the sugar is not neutralised by bleaching agents, but they say that it is also caused by impurities left in the juice as well as by the addition of molasses. In forwarding this report to Sir M. Hicks-Beach, Lieutenant-Governor Young remarks that "the investigation cannot be taken otherwise than as a complete refutation of the allegation that sugars of the dark crystal class manufactured in British Guiana are artificially coloured." When Sir Edward Thornton communicated to the American Government the report which has now been published, they lost no time in admitting that they had been under an erroneous impression, and at the same time promptly removed the interdict which had temporarily excluded the suspected sugar from the American markets.

The Government fully approves of the suggestion made by the Government of India, that an officer acquainted with emigration business should periodically visit the British colonies and report on the state of the coolies residing there.

Correspondence.

BONNEFIN'S INVENTIONS FOR PULPING THE SUGAR CANE AND PURIFICATION OF ITS JUICES.

Glasgow, 20th of February, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Dear Sir,

Allow me to bring to your favourable attention, for being investigated by your readers, a report by Mr. J. Poculot, C.E., and agent at the Mauritius and Reunion for the well known great Engineering Company, of Fives Lille, in France, upon the Bonnefin process of pulpifying the sugar cane, and thereby extracting the *summum* of the saccharine matters; and upon his elastic filter for the so far perfect and absolute purification of sugar cane juice, that it is fit for the triple effect or the vacuum pan, without passing through any intermediate operation. Every one will understand the unavoidable consequence of such an improvement in the manufacture of sugar.

The document, of which the following is a translation, was published in the Cernéen Newspaper at Mauritius, on 30th December, 1879.

Yours truly,

A. FRANCIS.

Translation by Mr. W. N. De Mattos.

Having followed the interesting experiments made by Mr. Bonnefin on the Solferino Sugar Estate, I feel myself under the obligation both towards him and the public to describe what I have seen and what I think of those experiments.

After having received from Mr. Bonnefin a clear explanation of the details of his new system with reference to our great colonial industry, I have found that I had a community of ideas upon his two essential points, namely, the complete extraction of the juices from the sugar cane, and afterwards their absolute purification.

I thought that the first and principal trial should be made with his capillary elastic filter, which, notwithstanding being placed

second in his mode of manufacture, is nevertheless the essential implement of his system.

The first trials were made upon the cold raw juice as it came from the cylinders. They gave complete satisfaction as regards the purity of the juice, but they did not yield the necessary quantity for a large manufacture with only few filters.

The second trials were made with juices heated gradually to 70° centigrades. Then the results were as conclusively satisfactory in regard to quality as to quantity.

The capillary action was the only process used, because the steam gauge did not show or indicate the slightest pressure.

The out-turn of each filter has been, under those conditions, 12 barrels (2·724 litres) per hour: this is equal to 600 gallons per hour.

In both trials the juices have been treated *with lime only*.

Those juices were absolutely limpid and pure, to which stage the juices worked by the best actual operations do not approach, and in my opinion they might be submitted, as they are, to evaporation, as well in open pans, in triple effect, or in the vacuum pan.

The discoloring action of the sulphuric acid was very energetic on those juices which left no trace whatever of any deposit after decantation.

I have also to report upon the filtration, likewise effected by Mr. Bonnefin, of a mixture of the deposits of tanks or recipients, small megass and trashes, scums arising from defecation, washings up of the pavement, and every dirt found in the factory, to which was added a large quantity of water to dissolve that muddy mixture, and which yielded juice of weak density ($4\frac{1}{2}^{\circ}$ Beaumé), the juice being $6\frac{1}{2}^{\circ}$, but quite as pure as that obtained from the previous trials with juice.

I conclude, therefore, that the capillary filter of Mr. Bonnefin is an excellent implement, which will render immense services in the manufacture of sugar, and which is destined to be a powerful auxiliary when the question arises of the extraction of the juice by means of pulpifying the canes, a method which promises so large an increase in our out-turn of sugar.

This other process of Mr. Bonnefin raises, it is true, an important problem, that of the transformation of the megass fuel, but between such an increased out-turn of juice from the canes and the expense of this substitution of fuel, there exists a very great and sufficient margin to give satisfaction to the most exaggerated requirements of any planter, and assure the welfare of our only great industry.

Receive, Mr. Editor, my thanks for the hospitality of your columns, and believe me yours very truly,

T. POCULOT.

Port Louis, 29th December, 1879.

PROPOSED FURTHER EXTENSION OF THE USE OF POSTAGE STAMPS.

Richmond Hill, Montserrat, W.I.,

March 1st, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

I have read with much interest Mr. Fryer's article on "Post Office Reforms," in the *Sugar Cane* for February. But there is one view of postage stamps which he does not present to your readers, and it is one which I think requires more emphasizing than many others, and one upon the proper working out of which depends almost as great a convenience to the public as an ocean penny postage. I mean the recognition of the postage stamp as a bank note, negotiable as other bank notes, and (if necessary) convertible into coin at a Post Office; not that I think it likely that it would often be "cashed," but it should be as fully a "token" as a penny, or a shilling piece. This being once recognized, a "Postal Union" stamp would follow as a natural course, and should be quite untrammelled as to its issuing or cashing office. It should be an UNIVERSAL STAMP, and might bear the globe for a device. The facility which would thus be given for the transmission of small sums would be boundless, as the smallest amount could be sent, *without any fee*, from Madras to Melbourne or Montserrat. Thus, if I wished to forward to a bookseller 2s. 6d.

for a book, I should enclose in my letter a 2s. 6d. universal or Postal Union stamp. Under the present system I must pay 1s. 1½d. extra to procure a P.O.O., and give the bookseller and the Post Office no end of trouble over the matter.

It may be said, "How are the accounts to be disentangled, and the profit divided between the various nations and countries adopting the system?" This might be managed by a "Clearing House," if the weight of letters transmitted by each Post Office was kept; or, still better, by dividing the profit among the users of the Post Office, by a periodical reduction of postal fees. The true principle of the "Union" being unity, profit should not be made by one at the expense of the other.

If in years to come the community of postal arrangements and of small bank notes should lead nations to a still higher and greater union among themselves, the profit lost to the British Post Office will be gained many fold by the British nation.

I am, Sir, yours truly,

J. SPENCER HOLLINGS.

LATEST INVENTION.

The Rochester (New York) *Democrat* states that a company propose to put in operation at the lower falls of the Genesee river, at Rochester, a great motor, the invention of Mr. J. M. Bois. The company expect to obtain such an enormous power as will enable them "to supply the city of Rochester and vicinity with a motor, in lieu of steam, for mechanical and manufacturing purposes—a motor capable of working every and all portion of machinery in the city, with force enough reserved to supply compressed air and run all our street cars, unaided by any other propelling power. Also to supply the city with a light in lieu of gas, cheaper, brighter, softer, and safer than the Edison horse-shoe light. In this connection mention may be made of the fact that the company already produces a light which meets the description given, and where it costs a dollar a foot to generate gas, this light can be generated for a cent a foot. The Motor Company has already made partial arrangements with the street railway company, so that at the works of the former, at the lower falls, the air-cylinders to be put upon each car can be filled in a few seconds with enough compressed air to run them 16 miles. The tracks of the Rochester City and Brighton Railroad Company are already laid to the site of the company's works, so that the cars can be supplied without any additional expense in this respect. The new power can be supplied at less than one-tenth the present cost of horse power, and yet allow a very liberal margin of profit to the Motor shareholders."

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

1260. WILLIAM ROBERT LAKE, of Southampton Buildings, London. *Improvements in centrifugal machines for the separation of liquid from solid matter.* (A communication from S. S. Hepworth, of Yonkers, New York, U.S.A.)

1266. CHARLES DENTON ABEL, of 28, Southampton Buildings, Chancery Lane, Middlesex. *Improvements in apparatus for clarifying and drying lump or loaf sugar.* (A communication from the Machinenbau-Actien-Gesellschaft, vormals Breitfeld Danck & Co., of Prague, Austria.)

1536. JOHN McLAREN, of Leeds, Yorkshire. *Improvements in the manufacture of sugar.* (A communication from A. R. Mackenzie, of Mackay, Queensland, Australia.)

ABRIDGMENTS.

3284. CHARLES DENTON ABEL, of No. 28, Southampton Buildings, Chancery Lane, Middlesex. *Improvements in apparatus for evaporating or concentrating liquids.* (A communication from Julius Weber, Frederick Curtius, and Julius Curtius, of Duisberg, Germany.) This invention consists in furnishing an evaporating tank with a steam pipe, following the serpentine course of the pan; the steam passing through the steam pipe in the reverse direction to the flowing of the liquid. The concentrated fluid may be led to a reservoir, through which the liquid to be concentrated is led by a pipe to the first concentrating chamber. The communication between the last bend or chamber and the last but one can be cut off by a valve or similar contrivance, in order to clear away any solid matter deposited in the last chamber, without interrupting the process. The whole tank is closed in by a cover provided with a central escape pipe for the vapours, and a man-hole over each compartment. (This invention received Provisional Protection only.)

3348. WILLIAM GOSTWYCK GARD, of Dunstable, Bedfordshire. *Improvements in the processes or means of evaporation, concentration, and preservation of liquids and other substances, by desiccated warm air.* A fan or blower forces air through an absorbent material saturated with sulphuric acid, which desiccates and purifies the same. The air then passes into a heating chamber, from whence it passes on to and over the liquid to be treated contained

in pans suitably arranged. (This invention received Provisional Protection only.)

3488. CHARLES DENTON ABEL, of Southampton Buildings, Chancery Lane, Middlesex. *Improved apparatus for liquorizing or claying lump sugar by centrifugal action.* (A communication from Eugen Langen, of Cologne, Germany.) This invention consists principally in providing each of the liquorizing boxes in centrifugal machines, with a lip on one side of the same, which overlaps the contiguous side of the next box, and prevents any of the liquor from escaping between the boxes. The liquor is led into the central part of the apparatus through a stationary curved pipe, and in order to insure equal distribution of the liquor in the boxes, the latter are provided with perforated plates at the side next to the sugar moulds, instead of being left entirely open.

3633. ROBERT PZILLAS, of Brieg, Breslau, Germany. *Improvements in presses for compressing sugar in loaves, slabs, and other forms.* This invention consists in attaching the moulds to the lower end of a vertical shoot of some height. This shoot and the mould work up and down in a hopper provided with revolving blades and reciprocating arms, to cause the sugar to descend into the shoot, and to prevent caking. At each descent of the shoot and mould, the lower end of the latter is brought forcibly against a stop, thus compressing the sugar therein. When the mould is full, it is removed and replaced by an empty one, the up and down motion being automatically arrested for that purpose. The driving shafts also actuates a rotary cutter, which removes a little of the sugar from the open end of the full moulds, so that when the latter is placed on a slab with its open end downwards and subjected to a sharp blow, it falls from the mould on to the slab.

4995. JOHANN KROOG, of Halle-on-the-Saale, Prussia. *An improved filtering apparatus.* This is an improvement to express the fluid which remains in the cakes in the filter press. The filter press used is almost similar to that patented previously by the inventor, and numbered 3948, (described in the list for February, 1880), but differs in construction, as every alternate filtering plate is provided on both sides with an impervious elastic membrane, so that when the pressure is admitted into these, the membranes swell out and compress the cakes in the adjacent chambers.

AUSTRIAN.

(Patents issued during November, 1879.)

3414. F. FIALA, of Laun, and F. NESWADRA, of Jicin. *Metallic rifled filter-surfaces, especially for sugar works.*

3464. C. HERBST and A. HANL, of Kuttenberg. *Improvements in Napravil's beet-cutter for sugar works.*

3521. THE ENGINE FACTORY COMPANY, of Prague. *A beet-cutter with conical disc-knives.*

3586. W. PROCHAZKA, of Laun, J. BARTONICEK and C. JAROS, of Prelouc. *Purifying beet and sugar juice.*

3609. A. RUMPLER, of Hecklingen (Anhalt). *Purifying beet-juice and other vegetable sugar-juice.*

FRENCH.

132761. KROOG. *A grate-filter.*

132791. MIGNON and ROUART. *Apparatus for varying the temperature, steam condensers and evaporators.*

132802. CALLIBURSES. *A pneumatic evaporator.*

132828. MATHIAS. *An automatic hydraulic apparatus, with a flexible and extensible piston with a continuous motion and intermittent action, for extracting sugar juice in sugar works.*

132864. MOUVET. *Clarifying and decolouring beet-juice and syrup.*

132920. OLIVIER-LECOQ. *An apparatus for toppling and extracting beet-root.*

133054. TRANNIN, of Raquet, near Douai. *Improvements in continuous presses with metallic filtering cylinders.*

133283. THE MARKY BROMOWSKI AND SCHULZ MACHINE COMPANY. *Diffusion vessels for sugar works.*

133309. SEYFFART. *A continuous filter-press, with complete lixiviation.*

133,469. CAZET, LAFaurie, FOSSIER, and MATHEY. *Applying a new solidifying process to molasses and liquid substances in general.*

GERMAN.

9481. SCHEIBLER, of Berlin. *Improvements in his method of lixiviating sugar, and apparatus for lixiviating substances in general.*

9495. J. W. KLINGHAMMER, of Brunswick. *An apparatus for lixiviating solid substances (such as lime of molasses) by the vapours of solvents, in stirring the substances to be lixiviated.*

9664. G. VIBRANS, of Uefingen. *Purifying beet-juice by means of hydrate of silicic acid.*

9675. H. LARGILLERE, of Boistrancourt (France). *A continuous diffusion apparatus with inclined diffusers.*

ITALIAN.

(Patents issued during the Fourth Quarter of 1879.)

48. P. CALLIBURSES, of Constantinople. *A pneumatic evaporator or machine for concentrating aqueous liquids by simultaneous diffusion and ventilation.*

95. G. POSCHINI-FINETTI, of Acquapendente (Rome). *Extracting and crystallizing the sugar of the stalks of maize and sorghum.*

CERTIFICATE OF ADDITION.

220. M. WEINRICH, of Vienna. *Preparing and treating saccharate of lime (of molasses or syrup) by the previous formation of a compound of molasses and lime in the shape of sand, and by macerating the same with alcohol.*

SPANISH.

30. J. A. BAZÉ, of Havana. *A process for extracting the juice of sugar-cane, beet-root, and other plants.*

60. J. A. BAZÉ, of Havana. *A machine for disaggregating sugar-cane and other plants.*

AMERICAN.

225600. SAMUEL S. HEPWORTH, of Yonkers, New York. *Centrifugal machine.* In this apparatus the basket is mounted loosely on the spindle, and is provided with a sleeve in the centre fitting over an interior sleeve attached to a hand wheel. This hand wheel is provided with a central screw engaging in a hollow thread at the top of the spindle. This arrangement raises or lowers the interior sleeve on the spindle, and by means of a shoulder on this sleeve, and an interior flange on the outer sleeve, raises or lowers the basket. In its lowest position the basket rests on a valve fixed to the spindle, and revolves with the same, but on turning back the hand wheel the basket is raised, and may easily be moved round so that the openings at the bottom are no longer closed by the valve. The bearing at the lower end of the spindle is a ball moving in a socket, and above the driving pulley is fixed a ring on a loose sleeve, on spindle provided with projections which fit into holes in an elastic disc: projections on another ring attached to the framing of the apparatus also fit into this elastic disc. By this elastic bearing, any vibration or jarring is avoided.

225601. CHARLES H. HERSEY, of Boston, Massachusetts, Assignor to Charles H. and Francis C. Hersey, of same place. *Sugar moulding machine.* This apparatus consists of a series of moulds carried by a drum revolving beneath a hopper and above an endless travelling band. Distributors in the hopper keep the sugar broken up and help to load the moulds, and as each transverse set of the latter pass from beneath the hopper (when the drum is in motion) an incline packs the sugar evenly into the moulds, which then pass on to a fixed transverse plate, and at that moment plungers are caused automatically to descend in the moulds and compress their contents. In the further rotation of the drum the plungers are forced out still further and push the cubes of sugar from the moulds on to a removable tray on the endless travelling belt. A rake is then automatically pushed forward to set the cubes in a row on their plate.

225631. TEILE HENRY MULLER, of New York, Assignor to Samuel S. Hepworth, of Yonkers, and Joseph Colwell, of New York, one-half to each. *Centrifugal machine.* This improvement relates to the valves for discharg-

ing the contents of a centrifugal machine. The basket of the machine is fixed on the spindle, and the valve is loose and supported by an annular plate attached to the basket. The valve is provided with holes, into which enter pins passing through slots in the bottom of the basket, and firmly fixed in the lower part of a sleeve on the central part of the basket. This sleeve is provided with a hand wheel; and, the slot in the bottom of the basket being concentric with the sleeve, when the hand wheel is turned, the valve moves with it sufficiently to open or close the openings in the basket. When the basket is in motion, the pins are at one end of the slots, and the valve revolves with the machine; but when it stops, the impetus acquired by the valve tends to carry the same forward, and open the outlets automatically.

225939. FRANZ O. MATTHIESSEN, of Irvington, New York. *Centrifugal apparatus for liquorizing hard sugar.* The liquorizing boxes are formed with the bottoms chamfered or sloping inwards and upwards. They are loosely supported upon floor of the basket, between guiding walls, and thus when the basket rotates, they are thrown outwards against rubber gaskets on the inner ends of their respective sugar moulds, and form a tight joint therewith. The white liquor is then admitted. When the machine is stopped, the chamfered bottoms of the liquorizing boxes cause them to fall away from the moulds.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To APRIL 17TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	7.7 ..	51	97 ..	87	94 ..	81
Liverpool ..	55 ..	41	76 ..	87	65 ..	70
Bristol	4 ..	4	15 ..	17	14 ..	16
Clyde	42 ..	35	77 ..	76	67 ..	72
Total ..	178	131	265	267	240	239
Increase..	47		Decrease..	2	Increase..	1

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST MARCH, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepôts.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
145	153	34	95	5	432	440	450

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST MARCH, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepôts.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
945	313	30	297	185	1770	1780	1616

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	270,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	385,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	60,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,375,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

The abstraction of attention from business consequent on the General Election, as well as large arrivals of sugar at the ports, caused the market to be very unsettled and irregular during the past month ; and though, as a rule, importers did not press sales, transactions show a decline in price.

Within the last few days, however, the demand caused by the reduced stocks in the hands of refiners and grocers has produced an improvement in the price of both raw and refined. The market closes with a more cheerful tone and firm at the recovered prices.

The imports in 1880 compared with those in 1879 show a decrease of 1200 tons against a decrease of 21,600 tons shown last month.

The deliveries which last month showed an increase of 7,800 tons, now exceed those of last year by only 370 tons.

The stocks of sugar on the 17th April were 46,900 tons in excess of those of the same date last year and 25,800 tons more than on the 1st January, 1880.

Present quotations of the standard qualities are as under :—
Porto-Rico fair to good refining, 21s. 6d., to 22s., against 23s. 6d. to 24s.; good to fine grocery, 24s. to 26s., against 25s. 6d. to 27s. 6d.; Martinique crystals, 26s. to 27s., against 27s. 6d. to 28s. 6d.; No. 12 Havana, 23s. 6d. to 24s. against 26s. to 26s. 6d.; fair to good refining Cuba Muscovados, 21s. to 21s. 6d., against 22s. 6d. to 23s.; middling to good brown Bahia, 19s. to 20s., against 20s. to 21s.; good to fine Pernambuco, 20s. to 21s., against 21s. to 21s. 6d.; Paris loaves, 26s. 3d. to 27s., against 28s. 6d. to 29s. 3d.

THE SUGAR CANE.

No. 131.

JUNE 1, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

M. LEON SAY IN LONDON.

The following letter has been addressed to the Foreign Office. We only print that part of the inspired article which refers to the sugar question:—

9, Mincing Lane,

15th May, 1880.

The Rt. Hon. the EARL GRANVILLE, K.G., &c., &c.

My Lord,

An important article appeared in the *Daily News* of the 10th inst., stating so directly the French view of the situation with regard to the commercial treaty with France that it may be regarded as partially inspired.

It is headed "M. Léon Say," and contains the following passage:—

"Should this conclusion be arrived at, the discussion will be narrowed to two important issues. On the French side concessions will be asked for in the wine duties, and made on that sugar question which has caused much agitation and not very logical talk on this side of the channel."

A considerable portion of the article is therefore devoted to a statement, "from the French point of view," in reference to this "sugar question."

My Committee have thought it their duty to write a reply in correction of various assertions contained in this statement, and I am now desired to forward it to your lordship, with the request that it may receive the attention of Her Majesty's Government.

Under the circumstances we consider it important that your lordship should be in possession of the real facts.

I beg, therefore, respectfully to enclose a copy of the article and of our reply.

I am, my Lord,

Your obedient servant,

(Signed) JAMES DUNCAN,

Chairman British Sugar Refiners' Committee.

Extract from leading Article in "Daily News," May 10, 1880.

M. LEON SAY.

* * * * *

Should this conclusion be arrived at the discussion will be narrowed to two important issues. On the French side concessions will be asked for in the wine duties and made on that sugar question which has caused much agitation and not very logical talk on this side of the Channel.

* * * * *

There is no great reason to imagine that the sugar-bounties will form a serious obstacle to a new treaty of commerce. The subject has been so fully discussed in this country that a mere allusion to its salient features will suffice.

From the French view-point the so-called bounties are not bounties at all, but merely a drawback calculated upon a too liberal scale. Frenchmen observe that as we have drawbacks upon exciseable articles exported, such as beer and raw spirits, so are they who impose a large import duty upon raw sugar, obliged to grant a corresponding drawback upon it when manufactured and exported.

"*Daily News,*" May 15th, 1880.

M. LEON SAY AND THE SUGAR
BOUNTY.

TO THE EDITOR OF THE "DAILY NEWS."

SIR,—The part of your interesting article in Monday's *Daily News* referring to this subject gives the French view of the matter. I hope you will kindly allow me to point out where and how we differ from it.

It is not correct to say that "from the French view-point the so-called bounties are not bounties at all, but merely a drawback calculated upon a too liberal scale." When the French Government, in 1862, appealed to ours to join in endeavouring to stop export bounties, the word "prime" was most distinctly used, and has been used in France ever since, in innumerable international conferences,

It has been a very general custom to allow a slight margin on the drawback over and above the exact equivalent of the duty levied on the raw, or excise upon the manufactured article, this practice being defended on the ground that, owing to the levying of the tax the holder or manufacturer has been put to expense and delay, and in many cases compelled to carry on his work, not in the cheapest and easiest way for himself, but under the conditions of time and place as prescribed by law.

It is admitted without the slightest hesitation that the margin on the sugar drawback is large, and at the same time it is declared that the French Government has not the slightest wish to tax the nation in order that sugar refiners may make fortunes.

The difficulty appears to consist in getting at an accurate adjustment of drawback and duty, so as to allow the manufacturer a very slight margin instead of the actual profit that he now enjoys. Two methods of taking the duty present themselves: one the saccharometric method, analogous to the process employed at Somerset House for arriving at the amount of draw-

diplomatic despatches, parliamentary speeches, official courts of inquiry, and newspaper articles.

The tax on sugar in France puts the refiner under no restrictions and involves him in no expense. On the contrary, the credit he receives on the duty is equivalent to supplying him with his working capital. There is no ground, therefore, in this respect for allowing him a margin between duty and drawback.

It may be "declared that the French Government have not the slightest wish to tax the nation in order that sugar-refiners may make fortunes"; but the fact remains that they evaded the execution of the treaty during the whole time of its duration, that they subsequently made promises which they did not fulfil, and that they have at every conference, and during the whole of the negotiations of the last eight years, contrived to interpose every possible delay and obstruction in the way of progress towards a satisfactory settlement.

There is no difficulty whatever in abolishing the export bounty. It has long since been admitted on all sides that any "adjustment of drawback and duty," which would preclude an export bounty is impossible. The French Government has been urged, quite as strongly in their own country as in diplomatic correspondence and international conferences, to adopt the

back to be allowed on beer exported from this country. The large margin allowed to French sugar refiners, of whom, as a matter of fact, there are very few, has arisen in part from the real or supposed uncertainty of the saccharometric system, and the natural desire to give the refiner the benefit of the doubt. A great change, however, has been worked in France during the last two years. The consequence of an important series of laboratory experiments has been the manufacture of instruments and the knowledge of methods which may be absolutely depended upon.

Whether the French sugar refiners will prefer to stand by the test of carefully conducted experiments or to refine in bond remains to be seen. There are objections to refining in bond, as to many methods of levying excise, that it opens a loophole to fraud. The French sugar refinery trade is, it has already been observed, in few hands. The refiners are men of great wealth and influence, and it is, therefore, argued with some appearance of reason that the Government officials appointed to supervise the process of refining in bond might be subjected to unfair temptation. It is this difficulty which has paralysed for a time the action of the French Government; but there is no doubt that the matter at issue between England and France could be adjusted.

only remedy—the abolition of drawback. They have given the strongest assurances that they will do so—a law was actually passed with that object—and yet things remain as they were. “The saccharometric method” was exhaustively discussed at the International Conference held in Paris in 1876, and most completely condemned.

The abolition of drawback, with the consequent necessity for refining in bond, was fully debated in the National Assembly in 1874, and adopted by a large majority. One fact alone is sufficient to show that there is no difficulty in such a system. There are in France five hundred beetroot sugar factories, in which sugar is manufactured in bond; this sugar, if exported, of course receives no drawback, and, therefore, no bounty. No difficulty arises in the excise supervision of these factories, and the manufacturers have given evidence on more than one occasion to the effect that the system is no hindrance, annoyance, or expense to them, but an actual benefit. It is only necessary to extend this system to the refineries to secure the abolition of the bounty. This the French Government now distinctly refuse to do till export bounties are abolished in Holland, Germany, and Austria. France has had many years' experience of the manufacture of sugar in bond, and the

This, however, is not the whole of the sugar question, which, according to French opinion, could be settled best of all by making it an international question to be debated in a Congress at which Germany and Austro-Hungary certainly, and the United States also, if possible, should be represented. For the present, however, England is mainly concerned with the French bounty or drawback, as France is with the extension of her wine market. How the negotiations for the renewal of the Treaty of Commerce are to be opened remains to be seen. Whether the matter will be referred to a mixed commission to be fully debated, is not known at present. Nothing, in fact, is certain, except that in the present temper of commercial France there is no chance of the French Government taking the initiative, although the wish to arrive at a base of negotiation is distinctly affirmed by the presence of M. Léon Say as Ambassador at the Court of St. James.

fact is established beyond question that not an ounce of sugar escapes the duty.

I have stated, as briefly as possible, the reasons why a different view must be taken on certain—perhaps on all—the points touched upon in your interesting article, and I venture to hope that you will, with your accustomed fairness and impartiality, give your readers both sides of the question. Confirmation as to details we are fully prepared with.

I may add, to show the reality of our complaint at the present moment as for years past, the extraordinary fact that the Paris refiners are now giving 26s. per cwt. for cargoes of raw sugar arriving in the Channel, and selling their loaf sugar for present and forward delivery at 26s. 9d., free on board in Paris, for shipment to this country. After charging freight on the raw sugar to Paris and cost of refining, this leaves an apparent loss to the French refiner of between 4s. and 5s. per cwt.

I am, Sir, your obedient servant,
GEORGE MARTINEAU,
Secretary British Sugar Refiners'
Committee.

21, Mincing Lane, May 13th.

THE PROPOSED NEW AUSTRIAN SUGAR TARIFF.

By Mr. NEVILLE LUBBOCK.

The duties on sugar beet in Austria are charged upon an assumed production of sugar from an assumed quantity of roots. In the case of factories where diffusion vessels are used, and almost the

whole crop is made in such factories, the Government assumes that for every hectolitre of cubic contents, 1,800 kilos. of roots are worked in 24 hours.

Having, on this assumption, which is considerably under the real work done, ascertained the weight of roots worked, duty is charged at the rate of 7 fl. 30 kr. per ton of roots.

The drawbacks allowed in the exportation of sugar are, for sugars from 92 to $99\frac{5}{16}$ polarization, 9 fl. 10 kr. per kilos.; for sugars over $99\frac{5}{16}$ polarization, 11 fl. 18 kr. per kilos.; below 92 polarization no drawback is allowed.

It was found, however, that under this system the sugar duties in Austria, instead of securing a revenue, could not be relied upon not to cause a loss to the Government; and in fact in the year 1875-6 the Government actually paid away in drawbacks more than it received in duties by 135,556 fl.

A new law was passed, therefore, whereby, whilst the taxation and drawbacks remained as before, the *fabricants* were made to guarantee to the Austrian Government a minimum revenue of 6,000,000 fl. for the year 1878-9, which amount was to be increased by 500,000 fl. yearly, until 10,000,000 fl. was reached.

It is now proposed to modify this law, and the following alterations seem likely to be made.

The duty to be raised from 7·30 fl. per ton of roots to 8 fl., and the drawbacks to be raised on sugars polarizing 92 to $99\frac{5}{16}$, from 9·10 fl. to 9·40 fl.; on sugars polarizing over $99\frac{5}{16}$, from 11·18 fl. to 11·55 fl.; thus increasing the duty and the drawback by 3·3 per cent.

The minimum receipts to the Treasury to be raised to 10,000,000 fl. for 1880-81, and to be raised by 400,000 fl. each succeeding year, until 12,800,000 are reached.

The mode of estimating the quantity of roots is somewhat complicated, it leaves open the door to considerable error, and it certainly does not seem calculated to enable the Government to arrive at a correct result.

The following calculation is interesting, and shows what will be the result of the new system as compared with the old, taking the

figures of crop 1878-9 as a basis and assuming that the amount of roots escaping the duty remains the same in both cases.

Under the present law, crop 1878-9:—

	Florins.
30,926,000 qr. met. were charged duty, amounting	22,576,190
Less deduction for stoppages, 8½ per cent..	1,926,190
	<hr/>
	20,650,000
Drawbacks paid	18,960,723
	<hr/>
	1,689,277
Amount required to be paid by <i>fabricants</i> ,	4,310,723
	<hr/>
	6,000,000

Result to the *fabricants*:—

	Florins.
*216,067 tons, at 110 fl. per ton	23,767,370
Less amount to pay Government	6,000,000
Nett amount of bounty received by <i>fabricants</i> ...	<hr/> 17,767,370

equal to 43 fl. per ton on whole crop.

93 ,, ,, export.

Under proposed new law:—

	Florins.
30,926,000 qr. met. of roots at 8 fl.	24,740,800
Deduction for stoppages, at 8½ per cent. ..	2,060,400
	<hr/> 22,680,400
Drawback in 1878-9.... 18,960,723	
at 3·3 per cent. ..	632,241
	<hr/> 19,592,964
	<hr/> 3,087,436
Amount to be paid by <i>fabricants</i> to Government..	<hr/> 6,912,564
To make	<hr/> 10,000,000

* The crop in Austria-Hungary in 1878-9 was, according to Herr Licht, 405,907 tons. The export amounted to 189,847 tons, leaving 216,067 for the home consumption.

Result to the fabricants :—

	Florins.
216,067 tons consumed, at 110 fl.....	23,767,370
Add 3·3 per cent.	784,311
	<hr/>
	24,551,681
<i>Less</i> amount to pay Government	10,000,000
	<hr/>
Net amount of Bounty	14,551,681

equal to 35 fl. per ton on crop.

78 , , , export.

So that, under the new law, the *fabricants* will still receive a subsidy of upwards of £1,000,000 per annum.

P.S.—Since the above was written it appears that under the new law, it is now proposed to allow a drawback of 8·40 fl. per 100 kilos of sugars exported polarising under 92 per cent. and not less than 88 per cent.

16, Leadenhall Street,
London.

ON THE PRODUCTION AND CONSUMPTION OF SUGAR.

By NEVILLE LUBBOCK.

In the March number of the *Sugar Cane*, of the year 1875, I contributed a paper on the Production and Consumption of Sugar of the World, so far as we had information, for a period of years extending from 1853 to 1873.

A pamphlet which has recently been brought out in Paris, by Mons. C. Bivort, gives me the means of supplementing the investigation of the facts connected with the supply and consumption of the world to a recent date, and, I think, it will not be uninteresting to your readers to learn something of the sugar history of the world, as therein set forth.

CANE SUGAR.

Beginning, as in 1875, with the production of cane sugar, and taking the average crops of the five years ending 1879, we find the following countries producing over 100,000 tons :—

	Average Crop, 1853-57.	Average Crop, 1869-73.	Average Crop, 1875-80.
Java.....	103,257	175,623	214,932
Cuba	358,134	701,431	589,587
Brazil	105,200	136,000	131,891
Mauritius..	103,499	118,126	117,199
Manilla ..	51,094	81,816	127,424
TOTAL..	721,184	1,212,996	1,181,033

And the largest crop made was in:—

Java	232,624 tons in 1877	.
Cuba	796,179 ,,	1873
Brazil.....	238,280 ,,	1863
Mauritius	158,209 ,,	1863
Manilla	135,691 ,,	1879

Thus confirming the view taken in 1875, that Brazil and Mauritius had arrived at their maximum crop, it would now seem that the same may be said of Cuba; while, on the other hand, Manilla and Java seem on the increase.

It will be noticed that taking the average production of these five countries, which are the largest cane sugar exporting countries of the world, we find a diminution as compared with the period 1869-73.

Coming now to the other cane sugar producing countries whose crops exceed 50,000 tons. We find:—

	Average Crop, 1853-57.	Average Crop, 1869-73.	Average Crop, 1875-80.
Porto Rico	80,743	95,532	73,098
Trinidad	25,372	51,199	50,320
British Guiana ..	38,104	63,922	90,266
Louisiana	142,078	61,863	84,496
	<hr/>	<hr/>	<hr/>
	286,297	272,516	298,180

Peru about 30,000 68,092

The largest crop made was in:—

Porto Rico ....	....	103,304 in 1871	.
Trinidad ....	....	59,593 ,,	1873
British Guiana..	....	107,584 ,,	1876
Louisiana (since American War)..	....	110,000 in 1879	.

from which we may conclude that Porto Rico is decreasing her production. Trinidad remaining stationary. British Guiana, Louisiana, and Peru are still increasing.

The increase in Louisiana was anticipated in 1875, and is likely to continue so long as the heavy protection which is awarded her in the United States lasts.

There remain Jamaica, Barbados, Martinique, Guadaloupe, Reunion, Egypt, and the lesser West India Islands. Their combined productions remain about the same as in the period 1869-73.

Adding together the average crops of the 10 largest cane sugar exporting countries, as given above, we have an average total production for the years 1875-79 of 1,547,305, against an average production for the years 1869-73 of 1,515,512; showing that the cane sugar production of the world has remained stationary. It has in fact been staggering under its competition with beet sugar, aided as that has been by state subsidies and export bounties.

BEET.*

Average Crop, 1853-7.	Average Crop, 1869-73.	Average Crop, 1875-80.
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208,000 tons.	983,075 tons.	1,361,747 tons.
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Showing an increase of 385,000 tons in the six years,—which is surely a marked contrast to the cane sugar productions.

The relative positions of the two great sugar industries can only be ascribed to the effect of the system of export bounties, which has been carried on in Europe to so large an extent, in fact, that some of the bounty receiving industries appear to be on the verge of succumbing under the competition of their more highly bounty-fed rivals.

We find, for instance, a marked difference between the figures of the French, Dutch, and Belgian industries, on the one hand, as compared with Austria on the other; the bounty in the former countries being less than that in Austria. The following figures show this:—

	Average Crop, 1873-76. Tons.	Average Crop, 1877-80. Tons.
France	429,556	335,325
Belgium	73,841	59,657
Holland	24,185	22,591
	527,582	418,173

* Figures taken from Herr Licht's circular.

Thus showing for these countries an actual falling off. Austria on the other hand, shows :—

Average Crop, 1873-6.	Average Crop, 1877-80.
188,175 tons.	342,218 tons.

Germany also shows a very large increase, her average crops having been—

1873-6.	1877-80.
286,906 tons.	388,130 tons.

CONSUMPTION.

The consumption of Europe and United States according to Herr Licht has been as follows :—

Tons.	Tons.
1868.....1,544,000	1874.....2,161,539
1869.....1,630,000	1875.....2,247,060
1870.....1,790,000	1876.....2,222,946
1871.....1,872,000	1877.....2,187,546
1872.....1,850,000	1878.....2,429,191
1873.....2,049,000	1879.....2,362,361
*Increase 84,166 tons per annum	Increase 50,000 tons per annum

It will thus be seen that the large increase of the consumption which has taken place in Europe and United States has practically been entirely supplied of late years by beet sugar, and it seems impossible to doubt that this rapid increase of beet sugar production, while cane sugar production has remained stationary, is the result of and has been caused by export bounties.

It remains for England to restore free trade in sugar, which has so long been denied on British markets; and we cannot believe that for the sake of a temporary artificial cheapening of one commodity, she will admit the infraction of principles, on which depend the security and vitality of all her industries, and the permanent interests of her consumers.

THE LONDON *TIMES* AND THE SUGAR BOUNTY QUESTION.

SPECIAL REPORT.

On Friday evening, the 14th of May, an extraordinary meeting of representatives of all the branches of labour connected with the home and colonial sugar industries was held in the Executive Committee Rooms, Commercial Road. The chair was occupied by Mr. JOHN MONTEITH, Chairman of the Philanthropic Coopers' Association. The President, in opening the proceedings, said that the crisis with regard to the sugar bounty question would now soon arrive. He meant whether there was to be a countervailing duty levied on foreign bounty-fed sugars or not. (Hear.) His own opinion was, judging from all the surrounding circumstances of the case, that Parliament could not and would not allow a great national industry, such as the sugar trade was, to become entirely extinct in this country, and that from a mistaken notion of the application of the principles of free trade, as many of the members of the present Government, and Parliament generally, were in favour of the objects the sugar operatives were trying to gain. There were, however, a few narrow-minded obstructives who had expressed themselves against the adoption of a countervailing duty; those who were so opposed were in the minority, and were happily getting fewer every day. Looking then at the present aspect of the case how they might, they could not but feel hopeful of a speedy and satisfactory ending to the agitation. He then drew a melancholy picture of the condition of the West Indian sugar plantations, owing to the falling off of the sugar trade caused by foreign bounties. From Demerara to Berbice the land was now overgrown with bush where only a few years ago luxuriant sugar plantations flourished, and gave work to thousands of people.

Mr. ST. LEDGER GILLMAN moved the following resolution:—

That in the opinion of this meeting of representative workmen, the best and most hearty thanks of the working classes, and especially of the East of London, are due and are hereby respectfully tendered to the Lord Mayor of London for the kind sympathy and support he has given to the national agi-

tation for the abolition of the foreign sugar bounty system. Further, this meeting thanks him for granting the use of the Mansion House for a public meeting on the all important question of the bounties, over which his lordship has promised to preside.

It was to be hoped that the meeting would result in forwarding the object for which it was held.

Mr. PHIPPS, representative of the workmen of St. Catherine's Docks, seconded the resolution, which, having been supported by Mr. BARRATT, of the London Docks, was carried unanimously.

Mr. T. M. KELLY, assistant general secretary to the National Committee, moved the following resolution :—

That this meeting, composed of the representatives of the allied branches of labour dependent for employment on the maintenance of the home and colonial sugar industries, deplores the economic ignorance displayed by such an organ of public opinion as the *Times* in dealing with the foreign export bounty question, and challenges that paper to prove that a duty countervailing foreign export bounties would have any other operation on market prices, or any other effect on the interests of the British consumers, than the cessation of bounties, and consequent restoration of free trade would have, if effected by the negotiations so persistently, but fruitlessly, prosecuted by both Liberal and Conservative Administrations for many years past.

He said the *Times* newspaper apparently wished to mislead the public and put a wet blanket on the efforts which the working classes of this kingdom were now making to obtain a fair price in their own markets for their labour. The leading organ of public opinion endeavoured to make out that what the sugar operatives required was to put the sugar question on a different basis to that which it held at the present moment, and that by so doing the people of this country would have to pay more for sugar than they were doing at present.

In the Money Article of the *Times* of Wednesday, the 12th, the following editorial notice and letter appeared, which he would read to the meeting. The city editor of the *Times* remarks :—

The following letter reiterates the well-worn arguments by which the loaf-sugar refiners of this country seek to re-establish protection in their own interests, but does not quite cover the ground indicated by our query. What we wished to get at was whether this country does or does not continue to do an extensive and profitable sugar-refining business, in spite of the bounties that may have so much aided the loaf-sugar makers on the continent. The

impression given by our trade returns is decidedly in favour of the view that the refining business of this country must have increased of late years, on the whole, proportionately to the increase in consumption, although the descriptions of sugar produced may have altered. It is, at any rate, unreasonable to suppose that the taxpayers of France and Holland will go on submitting, to an indefinite extent, to be mulcted for the benefit of a small class, and sugar refiners here, whatever their difficulties, have no right to expect that Parliament will step in to prevent either the foreign taxpayer from feeling the weight of these bounties, or the English consumer from gaining by them what he can. A "retaliatory" course, once entered upon, would open the way to many mischiefs, for the arguments that would justify the imposition of duties in this case are just as effective for those who would wish to "retaliate" on Germany, the United States, or Spain for their obnoxious import tariffs. The long and short of the matter, therefore, is that if the English loaf-sugar maker cannot make his trade pay he must find another. It is fair enough to agitate against foreign bounties, but it is neither fair nor wise to agitate for a departure from free trade principles at home, and we trust the new House of Commons will give no encouragement to any such doctrines:—

"May 11.

"Sir,—Your query has been answered several times in the public press. The consumption of moist or soft refined sugar, white and yellow, has increased in proportion with the largely increased consumption of sugar in this country. As foreign countries give an export bounty only on dry or hard refined sugar, that is the class of refined sugar which has been directly supplanted by foreign bounty-fed products. But the makers of moist sugars are affected indirectly by the sale of any kind of refined sugar below cost price, and they know not when their turn may come to meet with a direct subsidized competition. It is solely owing to the agitation of the question that this has hitherto been avoided. The fact that the condition of the whole refining trade has been fluctuating, uncertain, and unsatisfactory for some years, in spite of the very large and continuous increase in the demand for refined sugar, shows that it is not working under natural conditions. Moreover, if there were no foreign export bounties, British capital and labour would not only recover the manufacture of loaf sugar for our home consumption, but would obtain a very important export trade. France, Holland, Germany, and Austria export 350,000 tons of loaf sugar per annum, while we export none. The question is simply whether the existence of a useful and legitimate British industry should be subject to the caprice of foreign Governments, and whether British producers have not as much right as foreign producers to claim, on the principles of our commercial policy, equality of competition on British markets.

"The larger question of the injury to our natural sources of supply for raw sugar, arising from the now very serious export bounties on raw beet-root sugar, is clearly illustrated by your correspondent's letter in the *Times* of to-day. The sale of raw sugar below cost price must eventually destroy production in the West Indies and elsewhere, and leave us dependent on bounty-fed supplies.

"For these reasons the circular-letter from which you give extracts to-day points out that the system of export bounties is 'subversive of free trade and equally capable of destroying any other British industry, while threatening the security of all,' and that, therefore, 'a protest against export bounties involves the assertion of a principle of vital importance to all engaged in our national productions, industry, and commerce.'—I am, &c.,

"JAMES DUNCAN,

"Chairman British Sugar Refiners' Committee."

The "Thunderer," in its ignorance, declared that the anti-sugar bounty agitators required protection for their industry. That statement on the part of the *Times* was entirely without foundation in fact. (Hear, hear.) Protection was not required. What was wanted, however, was, that the principle of free trade should be allowed to reign supreme on British markets, and preservation secured from the concealed subsidies of foreign states. If protection or reciprocity were, in the ordinary sense, aimed at, he (the speaker) and those who acted with him would require the Government to put a tariff on sugars coming from the Continent, equal to that which the foreigners levied on similar English goods of the same description when entering their ports. It was quite clear that the *Times* had endeavoured to mislead public opinion on the question, and that in the most disingenuous manner. It also stated that if the sugar operatives of England could not compete with the foreigners as sugar refiners, they must give up their trade and seek another, or emigrate. (Shame.) Such a suggestion as that appeared very fair in theory, but how would it act in practice, or if it were carried out to its logical conclusion? (Hear, hear.) If continental Powers were allowed to destroy what Mr. Gladstone had truly called a "lawful British industry," they would not rest there. Their next move would be to destroy or paralyze the woollen industry of Yorkshire and the cotton manufacture of Lancashire. Such, then, being the case, their machi-

nations should be at once stopped. It would be much easier to prevent their plan succeeding with regard to the sugar industry than it would be with the others, and the sooner the Government laid hold of that fact the better. (Cheers.) If the question were left to the decision of the workmen of this country—not alone sugar operatives, but every working man—there would not be a hand held up against putting on a countervailing duty, or in favour of such arguments as had been put forward in the *Times*. (Hear.) To say the least of the statement in the *Times*, to the effect that if the sugar-refiners could not compete against subsidized sugar-manufacturers abroad, they must emigrate or find some other employment, it was cruel in the extreme. That was as much as to say that Englishmen must retire from their own markets, leave their homes and their country, and that, not to benefit the great mass of the population but foreign producers. (Cries of "Shame," and loud cheers.)

He would just read another letter from Mr. Duncan to the *Times*, which had been published :—

" May 12.

" Sir,—I am sure you will permit me to reply to objections of so serious a character as those you advance to-day. We are surprised to find them revived after the long discussion of this question, during which we have been told, on what we have every reason to believe to be good authority, that a duty to countervail a bounty is 'not only perfectly consistent with free trade, but positively conceived in the interest of free trade;*' that it 'does not involve any return to protection,'† that 'if a foreign country chooses to disturb one of our home trades by giving a bounty, we are quite at liberty to redress the balance, so far as we are concerned, by a countervailing duty, in order to preserve the trade as much as possible in its natural course.'‡ We ask only for equal competition on our own markets for all the world. For 18 years, Liberal and Conservative Governments have endeavoured to enforce this principle by obtaining the abolition of the bounties by treaty, which would have the further effect of preventing the consumer from 'gaining by them what he can.' A countervailing duty would enforce the same principle, but would secure to this country the benefit of the bounty as revenue so long as it continued to be given. It would be a tax on bounties, not on sugar, since the price of sugar would be adjusted exactly as if there were no bounty and no duty. Practically the bounty, being of no further

* *Spectator.*

† *Saturday Review.*

‡ *Statist.*

avail, would disappear, and the duty with it. The end which our negotiations have failed in obtaining would at once be secured. There is no 'retaliation' in such a policy as this; it is merely, in the one case, intercepting the bounty, removing it from the market, and securing it for the revenue, or, in the other, effectually securing what our negotiations have endeavoured but failed to obtain.

"This proposal would in no way justify the demands of those who wish 'to retaliate on Germany, the United States, or Spain for their obnoxious import tariffs.' We propose solely to carry out the commercial policy of this country by restoring equal competition on British markets. They desire to reverse that policy by creating unequal competition on British Markets, in the hope of thereby obtaining a nearer approach to equality of competition on foreign markets.

"You suggest that we should find another trade—that is, that each manufacturer should abandon the £50,000 or £100,000 which he has sunk in buildings and plant, and which he regarded as safely invested in what Mr. Gladstone calls 'a lawful branch of British trade.' The workmen he employs are to invade other fields of labour and endeavour to learn other trades. Our colonial sugar planters are to allow their estates to relapse into wilderness and their labourers into barbarism.

"I am, &c.,

"JAMES DUNCAN,

"Chairman of British Sugar Refiners' Committee."

In the *soi-disant* leading organ of public opinion, on the same day, the following remarks of the City editor appeared, in answer to the able letter from the Chairman of the British Sugar Refiners' Committee, clearly indicating that the *Times* had discarded fact and argument for misrepresentation. Such circumstance clearly shewing that the writers in that journal were bolstering up a bad cause and a universally admitted wrong to home labour, and an outrage on the principle of free trade. The editor remarks:—

The following further letter on the sugar bounty question does not carry us any further than many like it that we have published in times past, and we do not see much good in either reviving or continuing the threadbare controversy. Those who believe that a "countervailing" duty is not in its nature protective, and who consider that such a duty may be levied on the products of particular countries and not on others, are not likely to be convinced of their fallacies by any arguments, else it might be pointed out that the word "bounty," so often used, is itself misleading. No one has ever yet been able to say what the gain is which the French or Dutch refiners enjoy from drawbacks on their exports, nor has it been proved that their

supremacy over us in the manufacture of certain kinds of refined sugar is not to a great extent due to greater cheapness of raw material as well as to improved modes of production. Much evidence has been taken and laboured inquiries have been held; but, so far as we are aware, the English public is as little enlightened on these points now as it was when this agitation began. And we are inclined to think that the disastrous effects of the so-called bounties have been exaggerated, but, whether that be so or not, we cannot wholesomely destroy those effects by imposing special duties here. Such a step would retard, instead of promoting, the adoption of free trade by our continental rivals, and would in all probability lead to a war of "bounties" against "countervailing" duties, ruinous to all concerned. We trust, therefore, that sugar refiners will spend their energies in discovering other and more legitimate ways of defeating their rivals.

It was a great pity that a paper like the one from which he had just read should show its ignorance of so great a question, as that of the sugar bounty question, by saying that it was debateable whether bounties existed in France or not. In saying so much the *Times* had departed from the strict lines of truth, and by so doing had acted unfairly not only to the sugar operatives but to the British public generally. (Cheers.) The House of Commons knew, however, that bounties did exist, or else its members would not have granted a committee to enquire into the manner in which they operated upon English trade. To show beyond dispute the ignorance displayed by the *Times*, that bounties did exist in France, Austria, and other continental nations, with the permission of the meeting he would read the evidence of one of the most eminent French witnesses who had been examined before the British Select Parliamentary Committee on the Bounty Question. M. FORQUET, the witness alluded to, had been President of the French Budget Commission, was a leading member of the Chamber of Deputies, and had been deputed by a joint committee of the Raw Sugar Manufacturers of France and the refiners of that country to give evidence before the Committee of the House of Commons. M. FORQUET states that the result of a conference between the Raw Sugar Manufacturers' Committee and the Refiners' Committee was an agreement, which witness was empowered now to produce, by which the refiners assented to refining in bond, provided there was a clause in a Convention for a surtax on bounty-fed sugar. This

agreement was signed by representatives of the leading Paris refineries, including that of M. C. Say. The time had been too short for the refiners at the ports to be consulted, but it is one which would be agreed to by all the refiners in France. There are 34 refineries in France, eight of the largest being in Paris, M. Say's alone producing 80,000 tons a year. M. Leon Say, estimates the bounty on the excess yield at 3,864,225 francs; but if there be added the amount obtained by using *poudres blanches* and getting the drawback upon it as refined sugar, the bounty is raised to 6,438,068 francs, and to this must be added the advantage obtained through the error in the co-efficients, which is estimated at 2,500,000 francs, making a total bounty of about 9,000,000 francs. It was officially estimated in France at 10,000,000 francs in 1876. Cane sugars cannot compete with bounty-fed beet sugars, and the disappearance of cane sugar (in French colonies and elsewhere) will damage the consumer, because he will have to rely upon an artificially-fed industry. Witness corroborated previous witness as to refining in bond and a Convention with a surtax clause, the amount of the surtax to be decided by an international commission. Such a clause would never have to be enforced, because all the Powers would come into the Convention. If there is no Convention it is quite necessary that the French Government should give to the French manufacturers the same bounties as other governments give, or it would be quite impossible to continue the manufacture.

In spite of that, however, the *Times* says that there are no bounties in France. (Laughter.)

It should be clearly understood that what the raw sugar manufacturers required in France, was to be put on the same footing as those of Austria—namely, to have an export bounty given to them on raw and moist sugar. It took three pounds sterling a ton to destroy the loaf sugar industry of Britain, but it would only take, he could assure them, ten shillings a ton bounty to annihilate that of the moist. (Hear.) As had been stated, the bounty enjoyed by the loaf sugar makers in France amounted to ten millions of francs—a nice saccharine plum, and one which made the mouths of the raw

sugar men water—(laughter)—and that to such an extent that they intended to agitate their claims for bounties until the French Government acceded to their request. If such were the case, why the whole sugar trade of Great Britain and her colonies would be destroyed. (Hear, hear.) Two years ago the *Times* had had the effrontory to state that the sugar bounty agitation was “an agitation of the Whitechapel sugar bakers.” That statement was, however, on a par with all the others the same journal had made upon the question—simply not true in spirit or letter. (Hear, hear.) There were more interests concerned than those of Whitechapel sugar bakers. It was a national question, and as such should be treated in a large and not in a carping spirit. (Hear, hear.) If foreign bounties still continued to exist, without a countervailing duty being adopted by this country, the people—the consumers—must be the sufferers in the end, as they would have to pay much more for their sugar—and that for two reasons—than they did at present. The first reason was, the foreigners would have the markets all to themselves and could then charge what they had a mind to, because there would be no competition; and the second was, that the industry would be transferred from a natural to an artificial zone—a change which would render the crop precarious, and consequently dear. (Cheers.) Such, in fact, happened, to a limited extent, a short time since, owing to a partial failure of the beet. The British workman and producer were willing to compete with the whole world if placed upon equal terms, but they certainly did not get anything like fair play when they were so heavily handicapped as they were by foreign bounties. (Hear, hear.) It was all very well to talk about British workmen emigrating if they could not compete with foreigners, but to look at such a suggestion, even with a coolness equal to the spirit in which it was suggested, he should like to know what fund or institution existed to provide for such a purpose. (Hear, hear.) There was a new school composed of fledgling political economists springing up—but it was to be hoped they would never get beyond the pen-feather stage of being—who race away with the idea that the best policy to pursue was to buy everything in

the cheapest market. *Carpe diem* was their maxim with a vengeance. They thought only of to-day—the morrow would sure to take care of itself. (Cheers.) They cared no more for the future than did the gentleman who said, when asked to do a certain act which would benefit those who came after him, “Why should I; what has posterity done for me?” (Cheers and laughter.) Happily, however, those *après moi le déluge* description of politico-economists were scarce, and found but little favour with the true disciples of Adam Smith, Ricardo, or John Stuart Mill—(cheers)—and much less with the great and enlightened masses who constitute the strength and greatness of this kingdom.

In conclusion the speaker said that if ever an agitation deserved success it was that which had been caused by the sugar operatives of Britain against the bounties of foreign countries. It had justice and right on its side, and being backed by English perseverance and indomitable energy must in the end be crowned with the glory of triumph. (Loud cheers.)

The resolution was ably seconded by Mr. R. Strahan, president of the Hand in Hand Society, and supported by Messrs. George Jones, W. Jack (delegate East and West India Docks), and others, and was adopted amidst much enthusiasm. Arrangements having been made to send a deputation from the executive to attend the National Scottish Conference, to be held next month, on the bounty question, the proceedings terminated.

ON THE DETECTION OF STARCH SUGAR MECHANICALLY MIXED WITH REFINED CANE SUGAR.

By MR. P. CASAMAJOR.

(A Paper read before the American Chemical Society, March 4th, 1880.)

About a year ago we were often entertained by the daily press with accounts of the adulterations practised by sugar refiners, and, among these adulterations, the one most generally used, as we were then told, was the mixing of refined sugar with starch

glucose. I must confess that I never believed in such a practice ; for, although I had tried to procure specimens of such sugars, I was not able to find any, and one or two specimens which were given to me, as of sugar so adulterated, turned out to be pure, as far as the presence of starch sugar was concerned. The idea that these sugars were so adulterated very likely originated in the imperfection of the processes used to detect the presence of starch sugar.

This week, however, I have had the good fortune to come in possession of a sample of refined sugar largely adulterated with starch glucose. This sample was sent to Messrs. Havemeyer and Elder, from St. Louis, and a slip of paper in the box gave the information that the barrel from which this sugar was taken was marked " Powdered Sugar. Manhattan Sugar Refinery, New York " ; a refinery of the existence of which I have not been able to find any proof.

The incredulity which I previously maintained on the existence of adulteration by starch sugar was based on the following considerations :—

Gentlemen,— You all probably know that if you have a sugar solution, you can only obtain from it, by the ordinary processes of a refinery, a quantity of crystallized sugar representing very nearly the difference between the cane sugar present and the soluble impurities. If you have, for instance, a sugar solution whose co-efficient of purity is 90 per cent. the soluble impurities will represent 10 per cent. of the total of the substances in solution, and you can obtain, at the utmost, only $90 - 10 = 80$ parts of sugar from 100 parts of substances dissolved. Processes have been published whereby a greater yield may be obtained, but such processes require the use of alcohol or of large quantities of salts of magnesia, and they have never been used on any extended scale. As starch sugar in solution does not act otherwise than any other impurity in solution, the addition of it, in a dissolved state, to a sugar solution could not have any other effect than to diminish the yield of sugar and increase that of molasses.

The only manner in which starch glucose can be mixed with

refined cane sugar, so as to give a profit instead of a loss to the person effecting this mixture, is to mix the two substances in a solid state. Now, the starch sugar must either be added in large quantities,—and then it seemed to me that it could be easily detected by the eye or by the taste; or it must be added in very small quantities, and then the difference between the price of sugar and that of starch glucose would not leave a profit proportional to the trouble. My experience with sugar refiners does not lead me to believe that the refiner exists who would adulterate his products by adding to them only one to two per cent. of starch glucose. Such a thing would not pay.

The object of this communication is to give a few easy processes for the detection of starch glucose in commercial sugar.

By the use of the optical saccharometer, the presence of starch sugar may be easily detected, when in quantities as large as in the sample in question. It is a dextro-gyrate substance, and no other dextro-gyrate substance could be used to adulterate sugar with efficiency in such large quantities.

The direct test by the optical saccharometer gives 97 per cent. After inversion, the reading of the saccharometer is 9·8 per cent. to the left at 21° C . If we add these numbers we find, by Clerget's table, that they correspond to 80 per cent. of cane sugar. As the sugar is dry, the balance, 20 per cent., nearly represents the quantity of starch sugar, as from the appearance of the sugar there must be very little inverted sugar present.

I need not now consider the subject of inversion as a means of ascertaining the actual quantity of cane sugar present in a sample of commercial sugar, as I have already had occasion, in a paper read before this Society at our regular meeting of February last year, to discuss this subject at great length.* I may, however, say that if this sugar had been what we call in the sugar business a *straight sugar*, 97 per cent. of sugar, after inversion, would have given at 21° C — $32\cdot5^{\circ}$, instead of —9·8°. I call your attention to

* See *Journal of the American Chemical Society*, Vol. i., p. 26; also *Chemical News*, Vol. xxxix., pp. 212—234; *Sugar Cane*, Vol xi., p. 296; *Moniteur Scientifique*, Juin, 1879, p. 647; *Stammer's Zeitschrift*, Juli, 1879, p. 683.

this to show of what precious help the process of Clerget is in cases of this kind. It is a sad truth that very many persons, whose occupation is the analysis of sugars, are either entirely ignorant of the process of Clerget, or do not know enough about it to use it when they need it.

This sugar, tested by the alkaline copper solution, gives 17 per cent. of reducing substances calculated as glucose, which shows that the starch sugar mixed with refined sugar contained $\frac{1}{5} = 85$ per cent. of these reducing substances.

The process which I had the honour of describing before this Society at our June meeting* gives unsatisfactory results with sugar adulterated by starch glucose. This is due to the imperfect solubility of starch glucose in methyllic alcohol. After grinding the sugar under examination with the standard solution for three minutes, the process gave 85 per cent. of pure sugar—a discrepancy from the result by the saccharometer (80 per cent.) which never takes place with straight sugars.

Besides these processes, which can only be applied by persons provided with scientific appliances, the presence of starch glucose, when used in such large quantities, may be readily detected by very simple processes, which may be applied by anybody who wishes to use such means as are always at hand.

One process for the detection of starch glucose consists in adding to the suspected sugar somewhat less than its own weight of cold water and stirring for a few seconds. If starch sugar is present, it will be seen floating in the solution as white specks, which resemble crushed wheat. This appearance is due to the comparative insolubility of starch glucose in cold water, which allows it to remain undissolved quite a long time, and also to the fact that as the cane sugar present is crystalline, and its refrangibility is not very different from that of a sugar solution; the portion of it which remains undissolved is not so distinctly seen as the specks

*See *Journal of the American Chemical Society*, Vol. 1., p. 205; also *Chemical News*, Vol. xl., pp. 74, 97, 107, 131; *Sugar Cane*, Vol. xi., pp. 531, 588, 693; *Zeitschrift des Vereins*, Oct., 1879, p. 957; *Ann. de Ch. et de Phys.*, 5th Series, Vol. 18, p. 559.

of starch sugar. These specks are best seen by using a beaker glass, and putting only enough sugar and enough water that we may be able to see light through the flat bottom of the glass. If a flat-bottomed glass is not at hand, the observation may be made on a pane of glass.

This process for the detection of mixtures of starch glucose with cane sugar is so simple and satisfactory that I might well be excused from giving another, but the one I am about to give is useful for the detection of other foreign substances in the products of refineries. This process is based on this, that the taste of sugar has a tendency to dull our perceptions of the taste of other substances mixed with sugar. So as to neutralize this effect of sugar, we may, before tasting a suspected sample, put a pinch of pure sugar in the mouth. If after this sugar is dissolved, but while we still perceive its sweet taste, we put on the tongue a pinch of sugar containing starch glucose, we distinctly perceive the bitterish taste of the glucose.

This process is very useful for detecting other foreign matters besides starch sugars. The presence of chloride of tin in molasses or sugars, even when used in very small quantities, can be easily detected by its unpleasant bitter taste if, before tasting the suspected products, we fill the mouth with the pure sweet taste of refined cane sugar.

COLONEL STEWART'S LEGACY—FAULTY RUM.

To THE EDITOR OF THE "ROYAL GAZETTE."

Sir,

Before giving your planter reader the promised tip to show them how to get rid of *faulty rum*, I must ask you to reproduce an article written in that well known periodical the *Sugar Cane*, from the pen of Mr. John Y. McLellan, of Cullochfaulds Chemical Works, Glasgow, dated 12th November, 1879, under the title *A Complete Clarification of Cane Juice.**

* The letter here referred to appeared in the December number of "*The Sugar Cane*," 1879.

Now Sir, I have read a great deal about the clarification of cane juice, and have studied it is as a practical sugar maker, and I can safely say, that I have never come across such sound advice as what is contained in the above short article. I had arrived at the same conclusion as Mr. McLellan several years ago, and went so far as to cover the peculiar system of application by patent so as to prevent some charlatan from coming down and levying *black mail* upon me, (a full description of the patent appeared in the *R. Gazette* a short time ago).

It will at once be seen that by abandoning the troublesome application of sulphurous fumes at the mill end, we at once get away from the corrosive action of the sulphurous acid, which has worked such havoc upon our valves, valve boxes, pump barrels, seats, pump rods, and the damage to juice heaters which has been very great, also simplifying the mode of application, which, while the cush cush and other impurities came in for gassing, it was difficult to keep the strainers clean, especially where the more simple sulphurous box is in operation, and not the churn, latter could mix any thing, and has the advantage of saving the galvanised roof of buildings from being eaten out by the superabundant fumes which escape all over the works.

It will be readily seen that in thus finishing with either bisulphate of lime or sulphurous gas, you entirely get rid of the *manufactory of sulphite of lime salts*, nothing but the pure scum is sent to the distillery, and hence no bad ingredients to foul the spirits. Again it will be seen that by getting rid of charging all the impurities with sulphurous acid, less than half the quantity will be required ; and I have verified that part of Mr. McLellan's statement that "At this stage it will be observed that the liquor on the wall is slightly acid to test paper, but as it begins to boil, this acid becomes volatilized, &c." It is so, and while I coincide with Mr. McLellan in his value of vitriol applied in the pan before striking out, I can assure my brother planters, that by adhering to Mr. McLellan's advice, they can produce lovely yellow sugar with one-tenth the quantity of sulphuric acid now used, and above all,

they will once and for ever get rid of that which gave rise to all our *Rum troubles*.

Many will join me in expressing how much all practical planters and sugar makers are indebted to Mr. McLellan for his sound practical views upon the use of lime. Compare the last clause of his article with the vapid nonsense which we have thrust down our throats by mere visionaries; there is an unmistakable sound ring about it which chimes in with our every day experiences.

I trust the next time Mr. McLellan pays a "visit to the colonies" he may find himself in this place, where I can assure him of a hearty welcome.

I have now disposed of *Stewart's legacy* even when making yellow sugar, and

I remain,

Your obt. servant,

WILLIAM RUSSELL.

Leonora, 31st March, 1880.

BEET SUGAR IN NEW ENGLAND.

From the *American Cultivator*.

The friends of progressive agriculture will be pleased to learn that the beet-sugar industry in New England, so recently a matter of theory, pronounced by some conservative authorities as visionary and impracticable, has been reduced to a plain, matter-of-fact business operation. That sugar beets can be successfully raised in this section, and that beet sugar can be profitably manufactured in our own midst, are no longer matters of doubt even in the minds of the most sceptical, however simple the proposition may have appeared to the friends of the enterprise. The fact that within the past ninety days nine hundred tons of sugar and molasses have been produced by a single company in our neighbouring city of Portland, from beets raised in New England, is of itself worthy of mention, marking, as it does, the dawn of a grand and remunerative industry.

The importance of this fact is, however, increased when we con-

sider that the whole of this sugar and molasses, which found ready sale in Boston and New York for 110,000 dols., has been produced upon 1100 acres of land, or less than two square miles of territory; in other words, each acre of sugar beets in the State of Maine has produced 1633 pounds of sugar and molasses; or, to be more explicit, each acre has yielded 1200 pounds of sugar and 433 pounds of molasses, which exceeds the average product per acre from sugar cane in Louisiana.

This statement, though highly encouraging, fails to do justice to the facts, since the average crop of beets has fallen very far short of what may and ought to be raised. It was, in every sense, an experimental crop. In nine cases out of ten the farmers had never before raised sugar beets, and of course did not obtain the results which may be expected hereafter. This is shown by the higher average obtained in those localities in which farming has been brought to greater comparative perfection. For instance, Lancaster, Mass., has averaged eighteen tons to the acre, and Newburyport, with her experienced onion-growers, has averaged twenty-four tons to the acre. Taking the product of these two towns as a standard, we have twenty tons per acre, which would give us two tons of sugar and molasses actually obtained this year from each acre planted in these two localities of our own State. It follows from these figures, which are not hypothetical, but actual, that if Massachusetts, with an area of 7800 square miles, should devote one acre in twenty to the cultivation of the sugar beet, with the average result obtained this year in Lancaster and Newburyport, she would produce, on 250,000 acres, at least 500,000 tons of sugar and molasses, which, at the price realised this year by the Maine Beet Sugar Company, would be worth 55,000,000 dols., and would supply more than one-half the entire sugar consumption of the United States.

There is, of course, a less favourable side to the picture. Many farmers have not found their last year's crop remunerative, and will hardly be likely to repeat the experiment of raising beets, while the returns from sugar will not enable the company to pay any higher price for beets next year. In order to secure the 9000

tons worked last season at Portland, it was found necessary to employ canvassers in three States to contract with 1700 farmers, and to receive beets at 147 railroad stations, as well as by vessels and wagons. It is still a question whether our New England farmers, as a class, can afford to raise beets at prices that will justify the manufacture of sugar, unless they procure additional stock, and feed the refuse beet pulp upon their farms, as is done in Europe. Those progressive and intelligent farmers, who are proficient in their calling, whose land is in good condition, and who are familiar with the requirements of the beet crop, will average most remunerative crops. Such farmers, fully appreciating the value of the pressed pulp resulting from the process, will not fail to secure a supply for feeding to their cattle, thereby keeping up the manurial resources of the farm.

In this connection we make the following abstracts of facts taken from a circular letter recently issued by the Maine Beet Sugar Co. to the farmers of Maine : "It is due to the 1700 farmers who have raised beets for our Company that they should know the exact results. The average crop of 1879 on 1100 acres has been ten tons to the acre. In some cases thirty tons to the acre have been raised. In one town (Newburyport, Mass.) the average crop was over twenty-four tons to the acre. In other cases not enough has been raised to pay for the seed and fertilizers. Artificial manures, used alone, have not raised good crops and evidently will not alone supply the place of barn-yard manure. At certain stages of the crop, and in certain soils, reliable commercial fertilizers have proved valuable. We have worked up 9000 tons of beets, and have made 900 tons of sugar and molasses, which we have sold for 110,000 dols. We have paid farmers for beets delivered in Portland 56,000 dols.; for storing and pitting 4,000 dols.: total, 60,000 dols. We have paid for fuel, 10,000 dols.; for labour and other manufacturing expenses, 37,000 dols.: total, 47,000 dols.,—in all 107,000 dols. We have cleared 3000 dols., which will not go far towards paying for our machinery and fixtures, which have cost us 60,000 dols. You will see from these figures that we cannot pay more for beets than last year, except for early deliveries, by which we hope next year to lessen the cost of storing and pitting.

"The beet pulp has proved to be a very valuable feed for cattle, sheep and hogs—fully as good for feeding as the same weight of beets. Yet three-fourths of the pulp has been wasted this year because farmers do not yet know its value. Next year we hope you will give it a trial. Many farmers have been disappointed in the amount of their crops, because they have left too much space between the rows so that the ground has not been fully covered, while at the same time they have left the beets too close together in the row, thus stunting the beets. In Europe the rows are from fourteen to eighteen inches apart, while the beets are from eight to twelve inches apart in the row. If farmers will plant their rows nearer together and will leave fewer beets in the row, manuring well, planting early, using plenty of seed, cutting out the young plants from the intervening spaces across the rows with an eight-inch hoe and thinning out in good season, there is no reason why their crops should not average twenty tons to the acre. If they sell their beets for 5 dols. cash at the railroad station, and feed one-third of the weight of their beets in beet pulp, at a cost of less than 2 dols. per ton, there is no crop so profitable."

It is gratifying to note, in this connection, that while Maine has taken the initiative, and is entitled to the credit of having done so, yet in the development of the industry Maine and Massachusetts have gone hand in hand. Citizens of both states have from the beginning been represented in the capital and management of the company, and in the raising of the beets. New Hampshire, too, has already offered a State bounty. If Massachusetts should do the same, as Governor Long has recommended in his message, we may hope to see a rapid development of agricultural prosperity in New England. Movements for factories are already making in Northampton, Franklin, Lancaster, and other localities. If the tariff on sugar remains unaltered, and our currency continues on a specie basis, America may possibly at no distant day become the producer of her own sugar.

HOW BEST TO SECURE THE EVEN-RIPENING OF CANE.

From *Colman's Rural World*.

The experiments made the past season by Dr. Collier (of the department at Washington) and many others, including the writer, seem to conclusively establish the fact, that, to secure the best results in granulating, the cane should be perfectly ripe. This point established, it is easy to account for the total or partial failure of some sugar boilers to reduce their syrup to crystallization. They ground cane unevenly matured. My own experiments (and they were not carelessly made) convinced me that cane of that perfect maturity was a vital condition of success. No green stalks should on any account be allowed to enter the mill with the ripe ones.

How can we best overcome this unevenness of maturity? Let us notice for a moment a botanical law. In all grains, ripening commences at the summit of the ear and proceeds downward. In sorgo the difference is from 3 days to a week. In planting last spring, I divided some of the seed tufts into halves, and planted the upper and lower divisions separately. The cane grown from the upper half matured several days sooner than that from the lower half. I also noticed that the growth from the former was more vigorous, freer from suckness, and yielded a greater return. I am so well satisfied that this is an unfailing law of nature, that in preparing seed for my own planting the coming season, I have entirely rejected the lower half of the tuft. I would also say that if any others wish to test the matter, I will supply them with a small quantity (say from 2 to 5 lbs. each) of early amber seed, on the tuft, at 5 cents. per lb., tuft weight, which is just one-half the price I received for seed threshed from the whole tuft. As I have but about 60 or 70 lbs. to spare, this notice cannot be regarded in the light of an advertisement. I wish as many as possible to test the matter. I would also say that I will supply any member of the convention with pure Chinese cane seed gratuitously, in order

to test the truth of Mr. Stewart's theory in regard to its value as a sugar variety. Others will be charged the usual prices.

E. F. NEWBERRY, M.D.

Sharpsburg, Christian Co., Ill., March 26, 1880.

TRAMWAYS FOR SUGAR PLANTATIONS.

The following letter has been addressed to the Editor of the *Brisbane Courier* :—

Sir,—In going through the machinery hall of the International my attention was arrested by a neat light portable tramway, which I had not seen described in any portion of the Queensland Press, but which appears to me to be so admirably adapted to sugar plantations that I would crave space for bringing it under the notice of our planters. It is the patent of, and manufactured by, the well-known firm of John Fowler and Co., of Leeds. The gauge is either 16in. or 20in., at the option of the purchaser. The rails are of steel, and fastened to sleepers or ties of corrugated steel about 4ft. apart; it is constructed in sections of about 20ft. in length, and these lengths are so light that a man, by placing himself between the rails, can carry a section of this length for any distance. I carried one of these lengths with the greatest of ease. The manufacturers state, that in clearing beet root and canefields, four men can take up 400 yards of railway and relay them thirty yards further on in an hour and a quarter. The sections are fastened together at the ends by a very simple arrangement, requiring no tools, merely the turning of a screw with the finger and thumb. The cost is, for 10lb. steel rails, 16in. gauge, 3s. 6d. ; and 20in. gauge, 3s. 9d. per yard run. The waggons cost from £3 to £4 10s. each. I have no knowledge of engineering matters, but I forward herewith the manufacturer's description and diagrams, and would suggest that you submit them for the opinion of Mr. Pettigrew, who has had much practical experience in such subjects.

Yours, &c.,

P. R. GORDON.

Sydney, January 31st, 1880.

THE SUGAR BOUNTY.

MEMORIAL OF THE TRADES' COUNCIL.

The following memorial has been forwarded to the Treasury. At present it has been signed, we understand, by the representatives of the Shipping Trades' Council, and of the United Trades' Council of Liverpool, Leeds, and Hull, by twenty-nine representatives of the various trades of Bristol, and by the President and Secretary of the Allied Branches of Labour, in London, who have taken up the question.

We hope to be able to give next month, a complete list of the various associations and centres of industry which have subscribed this important document:—

To THE LORDS COMMISSIONERS OF HER MAJESTY'S TREASURY.

MEMORIAL OF THE

Humbly Sheweth,

That your Memorialists regard the foreign export bounty system as a specific attack by foreign States upon the interests of British labour, and submit that, upon every principle of justice and sound commercial policy, Her Majesty's Government should obtain from Parliament legislative sanction to tax off all foreign export bounties as revenue.

That your Memorialists deem it their duty to declare that acquiescence by Great Britain in a home market competition of subsidised products has never been, and cannot now be regarded as consistent with free trade.

That as the average rate of wages bears relation to the average prices of the products of labour, the fact that foreign export bounties operate as a constant element of price-depreciation, forces your Memorialists to consider with deep solicitude this particular form of foreign protection.

That after much consideration your Memorialists, bearing in mind their action in the case of the subsidised products of Prison and Reformatory labour, have determined to persist in urging upon the attention of Her Majesty's Government the necessity of Parliamentary action in the case of the sugar industry, seeing that all producers, both British and Foreign, not possessed of State bounties, compete on British Markets at a fiscal disadvantage proportionate to the fiscal advantage enjoyed by foreign exporters in receipt of a State bounty.

Your Memorialists are convinced that unless this form of protection,—differing from all others in that it lies within our national power to control it,—is dealt with on some settled principle such as your Memorialists have indicated, consequences most detrimental to the general interests of British labour will ensue.

That your Memorialists cannot conceive any Treaty of Commerce concluded by this country capable of being interpreted as conceding to Foreign States the unrestricted right of harassing British industrial production by a system of export bounties.

That your Memorialists humbly submit that the gradual substitution of Continental Europe for our own tropical possessions, as a source of sugar supply, brought about by artificial not by natural means, has an adverse influence upon the national wealth-production, and that, in respect of any profit arising from such foreign export bounties, no benefit arises to the nation by exacting from British producers—payable out of British wages and profits—the market equivalent in price of the foreign subsidy.

That your Memorialists allege as a fact that the increased demand for sugar has been met by Continental Europe instead of by our West Indian and other tropical possessions, and that such substitution of the Continental for the British zone of production has affected most injuriously the home labour dependent upon our tropical sugar production, more especially the coopers, coppersmiths, dock labourers, sugar warehousemen, and engineers, in addition to the specific injury inflicted upon home labour in the complete disorganisation of our loaf sugar refining operatives.

That your Memorialists repudiate any desire to obtain sugar artificially cheapened at the expense of their fellow workmen and in violation of free trade principles.

That your Memorialists declare that this question is most urgent, seeing that the labour interests of the United Kingdom cannot afford to lose so important a demand for labour as that which would be afforded if our sugar industry maintained its due proportion of the production necessary to meet the increased and increasing consumption.

That your Memorialists claim, as of right for every British industry, security on the home market from the pernicious influence of protection operating by means of State subsidies to any competitor.

And in testimony of all that this Memorial sheweth your Memorialists subscribe themselves as undersigned.

CORN-STALK SUGAR.

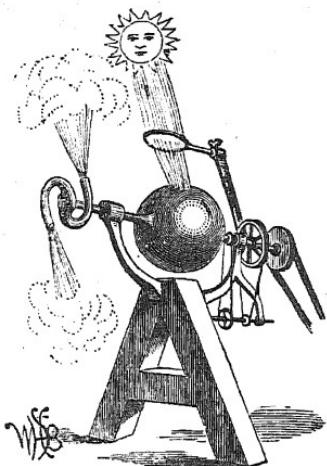
United States Commissioner of Agriculture Le Duc recently delivered an address to the farmers of Baltimore County, Md., upon the subject of the cultivation of sugar-producing plants. He had been invited, he said, to talk about the manufacture of sugar from corn-stalks and sorghum, the importance of which very few people understood. The sum of money paid for sugars in this country was equal to what is paid for breadstuffs. Nearly all the money paid for it, too, goes out of the country. Louisiana last year, produced two hundred million pounds, but there was an increase in the demand of three millions of pounds. He was in favour of the people of this country, aided by the Government, preventing this great amount of money going out of the country. The Department of Agriculture, it was true, sent out a good many seeds, but it was done generally by members of Congress to secure their election. They were sent where they would do the most political good, and not for the good of agriculture. More gold had been paid for foreign sugar than had been dug in California and Nevada. The sugar needed for home consumption can be produced here. During the past season, from Texas to North Minnesota, good merchantable sugar had been made for less than three cents a pound. You can make sugar in Maryland as certainly as you can make corn. After gathering your corn you can make sugar out of the best stalks and derive twice as much out of it as you did out of the corn. Nine hundred and sixty pounds to the acre had been made after the corn was gathered. This is an astonishing statement, but it is absolutely true. From corn stalks and sorghum, in five years from now, enough sugar can be made in this country for home consumption, and in six years we can export sugar instead of importing it. If we cannot make sugar of anything else, we can make it of beets, though, Mr. Le Duc argued, it was not as profitable to do it from that source as from the sources he had named. In order to make sugar from corn stalks, the corn should be pulled as soon as ripe. Freshly manured land was not good for sugar raising. Sorghum can be raised on poor land, and

the grain from sorghum is as valuable as oats, for fowls, cows, and sheep.

Probably Honduras sorghum was the best for this State and the South. It ripens in about ninety-two days and produces 150 to 400 gallons of sorghum syrup per acre. Corn stalks, after being run through the mill, are nearly as rich in flesh giving properties as before. In order to introduce sugar-making, co-operation was necessary on the part of the farmers. If you want a pair of shoes you find co-operation among the shoemakers. There was an order of Knights of Phythias. (Loud laughter.) Mr. Le Due was reminded that it was Knights of St. Crispin and he replied that it was some saint anyhow. (Renewed laughter.) This organization enforced co-operation. Railroads combined for mutual benefit, but farmers had not yet learned to organize and co-operate as they should. Washington advised that this Government should have a Department for farmers, but lawyers have the possession of the government and run it. They hold it and yet they are in a vast minority. For 100 years this Government has been governed by lawyers. They cared more whether Blackstone sanctioned a project than that it should increase the wealth of the land. There was an organization in this country called the Grangers, numbering 240,000, who were making their influence felt, and while, formerly, scarcely anyone in Congress wanted to go on the Committee on Agriculture, now, there are a great number. There is a wonderful change in this direction. Let us have a little co-operation. Mr. Le Due believed tea could be raised in this country, and he wanted the Government to give him a hundred-acre farm in South Carolina to experiment on. He also wanted a thousand-acre farm to experiment on—in raising sugar, &c. If the Government would make an appropriation of \$50,000 he could establish three central points to try the experiment of sugar-raising. If the farmers could be appealed to instead of Representatives in Congress he believed his request would be granted without any hesitation. (Applause.) During his remarks Mr. Le Due complimented Mr. Talbott, of Baltimore County, for his efforts in Congress in behalf of the Department of Agriculture.

BAILEY'S HOT-AIR ENGINE.

AN ENGINE WITHOUT BOILER.



"Fire he tames, and water serves him.
Earth her treasure-hiding robe
Raises at his bidding; lightning
Speeds his message round the globe.
"Fortnightly Review," August, 1879.

NEW means of producing power has had a great fascination for the inventive mind since Watt showed the use of steam. Our American cousins have been far more absorbed with the question than we, as an inspection of their mechanical journals for the past few years will show. Again and again the discovery of impossible perpetual motion is announced by unphilosophical inventors, and for some time the credulous have been exercised with a motor, known as

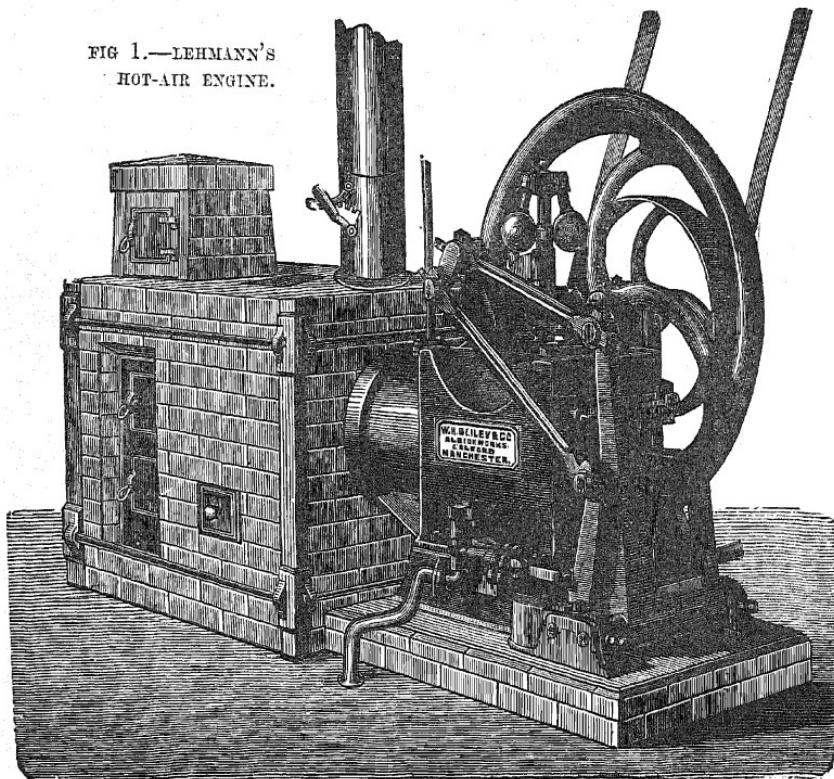
the "Keely," that will develope in an *inappreciable time ten gallons of a vaporic substance having an elastic energy of 10,000 lbs. per square inch at a cost of almost nothing!*

From Philadelphia comes the news of a wonderful spring motor, to manufacture which (says the *American Machinist*) a stock company, with half a million dollars capital, is to be organised in that city. Only New Englanders would have thought of a "new and giant motor" working with a mixture of the vile-smelling bisulphide of carbon and petroleum, which, however, one is not sorry to learn was a failure. The authority responsible for this news adds that "it took fully a year after the concern put that motor out of their shops to build steam engines, aided by the most approved system of fumigation, to eradicate the 'giant' odours from the place." Although several substitutes for steam power have been proposed that were chimerical if not altogether impossible, there are others based on sound principles that are now being applied to useful purposes. Amongst these may be mentioned gas

and petroleum engines, which have passed the experimental stage. To these may be added the water motors described in previous number of this magazine. Air in the form of wind is perhaps the oldest and certainly the cheapest provider of energy, and the attention of inventors has been directed to the best means of obtaining constant and steady power from this irregular source by employing the fitful wind to compress air or to raise water so as to store energy to be used as required.

Air engines of quite a different principle claim attention, depending on the property that air has, in common with all gases, of expanding when heated and contracting when cooled. Engines of this kind are manufactured (under the direction of the patentee, Mr. Lehmann) in Berlin by a large engineering firm, and in Salford at the extensive works of Messrs. W. H. Bailey and Co., one as made by the latter being represented in Fig. 1.

FIG. 1.—LEHMANN'S
HOT-AIR ENGINE.



To the non-mechanical it looks like an ordinary horizontal engine of a short stroke, but with a cylinder of rather larger diameter. It is, however, an engine without a boiler, and without steam, the cylinder having to play the part of the former, and the air in it the part of the latter. The end of the cylinder is built in a slow combustion furnace, which, it may here be mentioned, requires attention only two or three times a day. As the cylinder becomes heated—it finally attains a dull red heat—the air in it expands, and the piston is forced out, and works the crank, just in the manner of an ordinary steam engine. The expanded air now requires to be cooled. This is accomplished by a smaller piston called "the displacer," which, being forced into the air space by means of a crank action, drives the hot air to the front end of the cylinder, where it is cooled by a surrounding jacket of cold water. The ensuing contraction produces a partial vacuum, which assists in sending back the larger piston to its original position, so obtaining the return stroke. The alternate contractions and expansions take place in a much shorter time than it would be imagined. A small model that could be carried in the hand has been made that will work at the rate of one thousand revolutions a minute, which really means that the air in the cylinder of such a little motor *expands and contracts a thousand times a minute*. It would be difficult to convince many that this was really possible if it had not been accomplished.

Like the steam engine, the hot-air engine requires a supply both

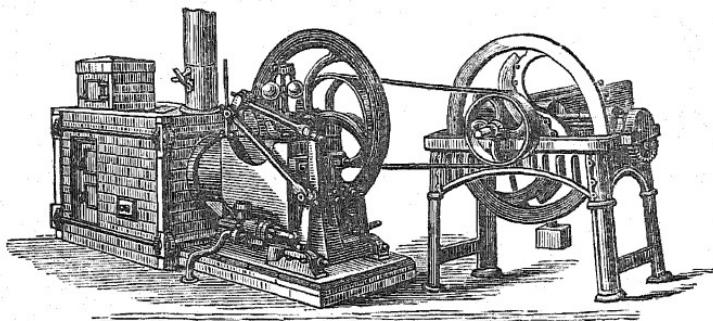


FIG. 2.—ONE USE OF A SMALL MOTOR.

of fuel and water. The latter—which it is understood is required only for cooling the cylinder—may be obtained from a cistern or tub conveniently placed. A motor of one or two horse power requires from five to twenty gallons to be kept slowly in motion from the easing of the cylinder to the cistern and back again by a circulating pump at the side of the engine. Of course if a slow stream of cold water is available no cistern or pump is required.

A two horse power engine can be driven twelve hours by the consumption of 56lb. of coal. Coke may also be used; indeed the latter is preferable, and the cost may be reckoned at twopence a day. In comparison with large steam engines this will not seem

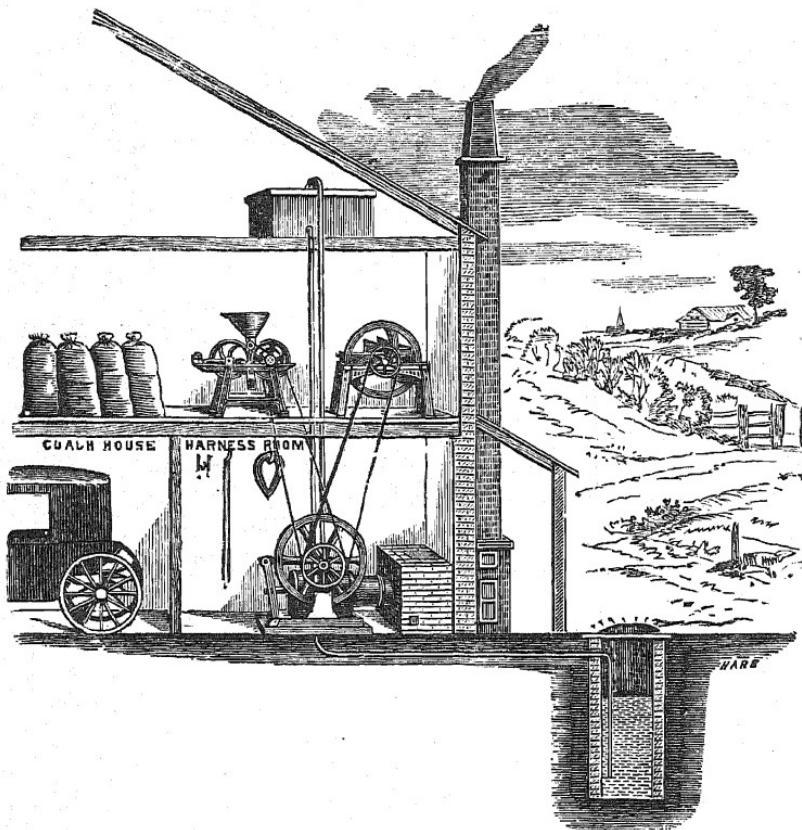


FIG. 3.—HOT-AIR ENGINE IN STABLES AND FOR PUMPING.

economical; but it must be remembered that for small motive powers the immense first loss of heat in boilers and flues makes them very extravagant in the use of fuel. Again, in favour of the hot-air engine, it is maintained that the energy developed is greater (up to four horse power) for the fuel consumed than that obtained from any steam, gas, or other engine. It has been said that the fuel is consumed in a slow combustion furnace. It is important to add that the furnace is smokeless, the smoke being compelled to pass the furnace before it enters the chimney, and the arrangement acts so well that no visible smoke passes away. Other recommendations are, that the engines are noiseless, and that no repairs are required for a lengthened period, if ordinary care is taken.

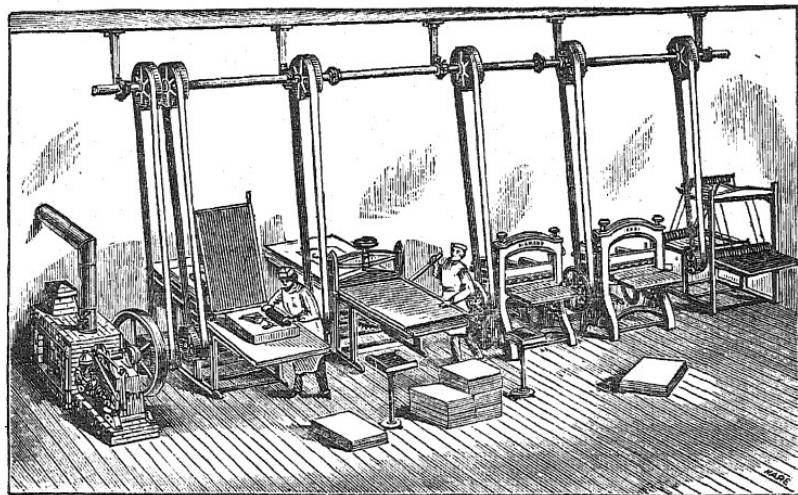


FIG. 4.—HOT-AIR ENGINE IN PRINTING WORKS.

Hitherto Lehmann's engines have only been made from one man power to five horse power, although there is nothing to prevent larger sizes being made. In Fig. 2 a half-horse motor is represented driving a chaff-cutter. The next figure shows the arrangements at the stable and coach-house of Mr. A. Winterbottom, of Weaste, near Manchester. The engine is of one horse power, and is used for crushing and chopping for the horses, as well as for warming

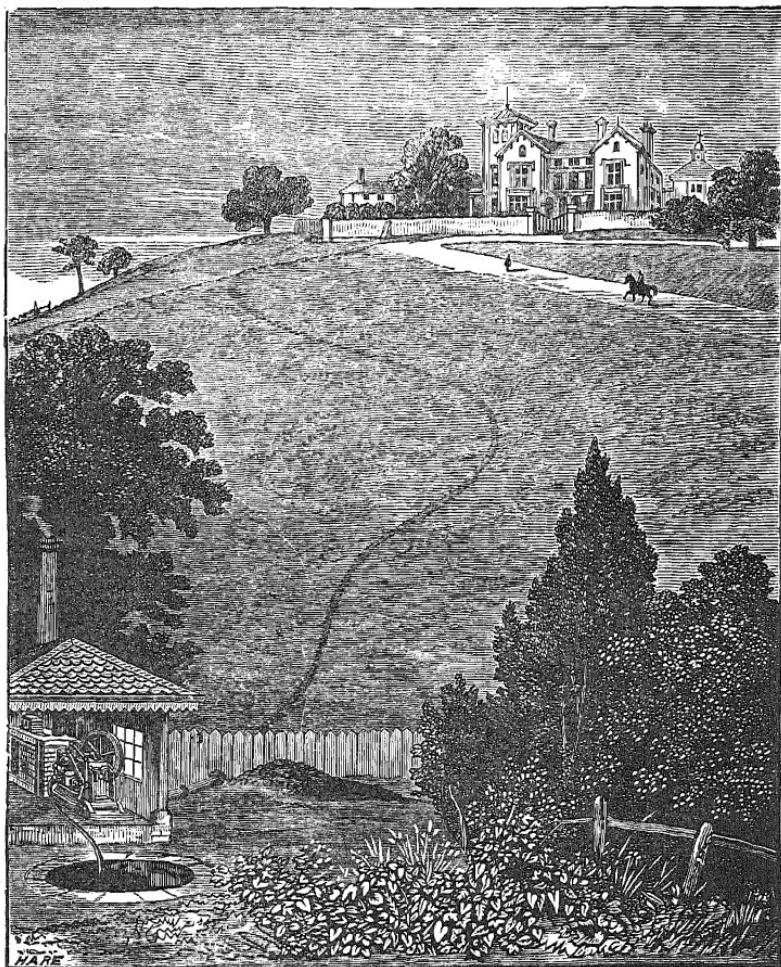


FIG. 5.—RAISING WATER FOR A MANSION.

the coach-house and harness-room. The water used for condensing becomes slightly warm, and is employed for the use of the horses and other stable purposes. When, on reference to the illustration, it is seen that the engine is also employed in pumping water from a well, it will be guessed what a great convenience it is in a country house or farm. That no skilled engineer is required should be a cogent argument to the proprietors of small workshops, such

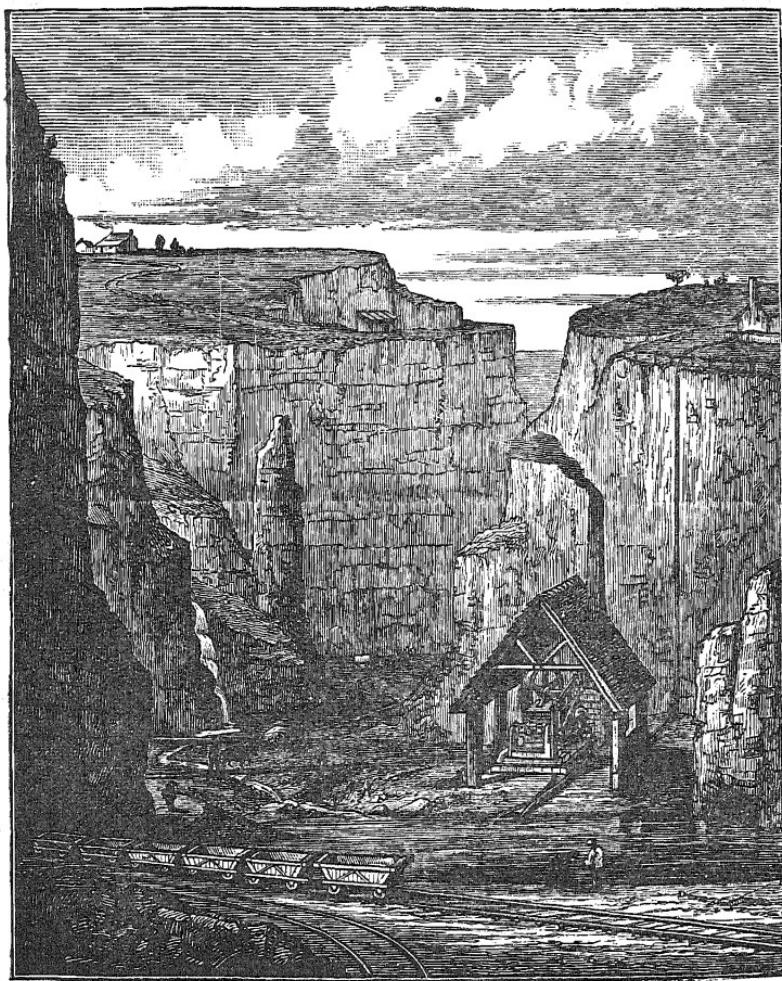


FIG. 6.—HOT-AIR PUMPING ENGINE DRAINING MINES.

as Fig. 4 illustrates, where the paper-cutting machines and printing presses are driven by an engine, which is also a stove for warming the room, and a convenience to the presiding Caxtonians. The illustration represents the interior of an actual printing establishment at Riga, where a two horse power engine has been at work for three years in a most satisfactory manner. Vegetarians should

be interested in the fact that Bailey's hot-air engine is grinding oats, &c., at Smallman's Dietetic Restaurant, Exchange Arcade, Manchester.

The views in Figs. 5 and 6 are arrangements for raising water. They require attention twice or thrice a day only, and a light wooden shed is sufficient for their protection. The quarter and half horse engines are quite sufficient for all the requirements of a very large mansion, when only used for pumping; for mines and quarries it is obvious that all sizes can be applied with useful effect.

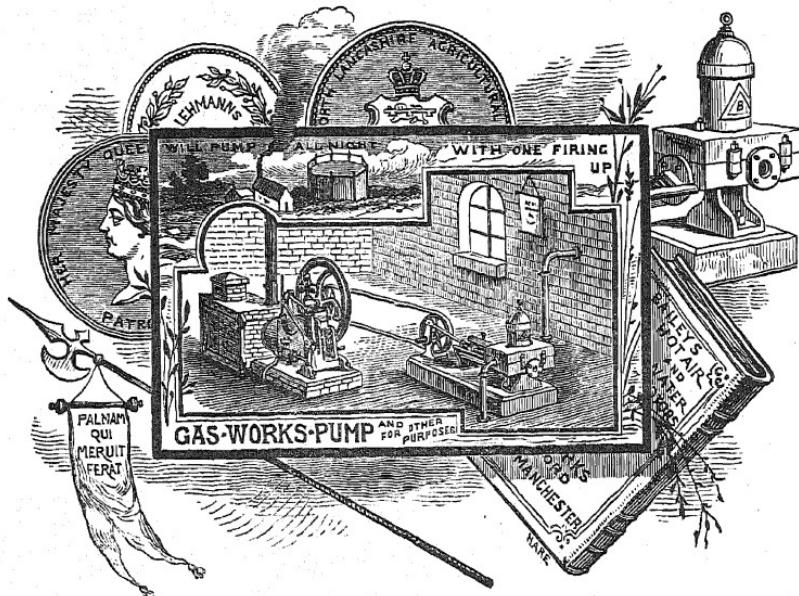


FIG. 7.—USE OF THE NEW ENGINE IN A GASWORKS.

Mr. J. Dunning, C.E., of Middlesbrough, has suggested that this new motor will be very serviceable for pumping ammoniacal liquor and tar in gasworks, especially small works, as the expensive attendance that is required for a steam engine can be dispensed with, and coke, always plentiful in gasworks, can be used as fuel. This application is seen in Fig. 7.

In the next figure (Fig. 8) is shown a modification for deep wells, which will be readily understood by those learned in pump lore. For many other purposes, such as Fig. 9 artistically suggests, these engines are in large demand.

These attempts to introduce a really workable air engine have been failures, principally on account of the great difficulty of keeping the piston and cylinder tight; but by a stroke of ingenuity the difficulty has been overcome by placing the only packing, which is of leather, in the front cool part of the cylinder. For this success the patentee and Messrs. Bailey may be congratulated,

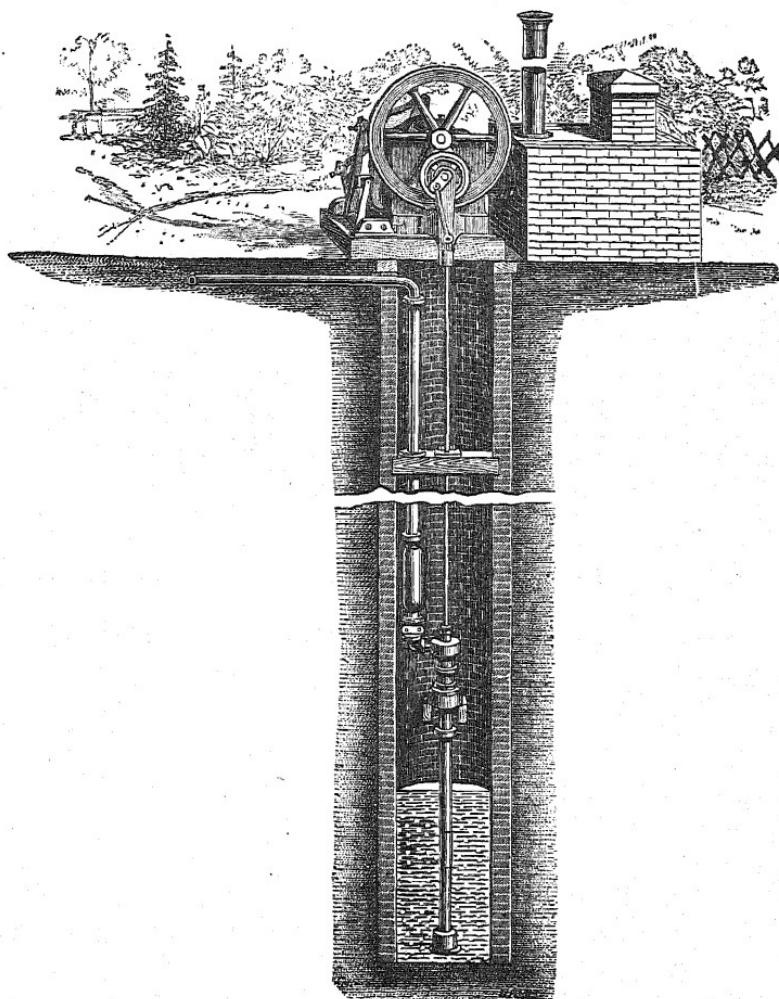


FIG. 8.—DRAWING WATER FROM GREAT DEPTH.

for every means by which power can be produced and applied more economically is of public importance.

The beauty of the new contrivance will be better appreciated when it is compared with one of the most successful of its predecessors, the heat engine of Dr. Robert Stirling, of Glasgow, patented in 1817. After the experimental labours of nearly thirty years an engine was erected at Dundee, where it continued to work for four years. A steam engine was afterwards substituted, which, although consuming 26 ewt. of coal against $4\frac{1}{2}$ cwt. consumed by the air engine, was found preferable on account of the difficulty of preventing the burning out of the chamber in which the air was heated. The cooling of the air, in order to secure the return stroke, was accomplished in a manner which, in comparison with Lehmann's idea, will appear exceedingly primitive. A piston, of smaller size than the cylinder in which it was fitted, made of plaster of Paris, was caused, by means of an eccentric, to travel towards the source of heat at the bottom of the cylinder, and, being of a non-conducting material, it cut off the heat from the air above, which, being in contact with the cool upper part of the cylinder, experienced a speedy loss of heat.

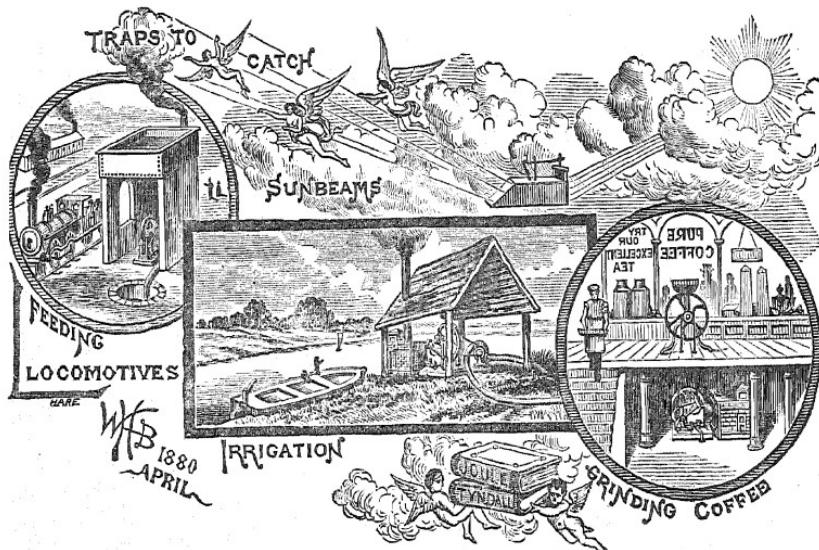


FIG. 9.—THE HOT-AIR ENGINE VARIOUSLY EMPLOYED.

The speed of the engines can be governed to a most accurate performance. This is of some importance when the power is required for the electric light or for any purpose requiring great uniformity. The ordinary governor balls are used, which, acting upon a brake, cause fewer revolutions, and therefore less consumption of fuel, as the fuel used, of course, is in proportion to the number of strokes performed by the engine. It will have been apparent to those who have read this description that there is no "exhaust" into the room—that is to say, there are no valves, and no blowing into the room of products of combustion. This is of great importance where rooms are worked in, as with gas engines, for instance, the waste products are very unhealthy. The stove of the engine may be used for hot-air ventilation, and for drying, baking, and cooking.

THE PROGRESS OF CANE CULTURE IN AUSTRALIA.

Bundaberg puts forth a claim to be counted in with the list of sugar producing districts that have done well during the manufacturing season just closed. The output for the season, as recorded in the *Star*, is 288 tons, not a large quantity certainly, yet one of the most notable yields ever secured in Australia. The 288 tons were got from 86 acres of cane, grown by Mr. S. Johnson, of the Waterview plantation. The cane is reported as Salangore, and two years old, and the factory in which it was crushed and manufactured was at work for its first season. The result is highly creditable, and it is excusable of our contemporary to indulge in a crow over it. The process of manufacture employed was in the open battery, then vacuum pan and centrifugals; and we are not surprised to learn that from cane standing at no time under 10° Beaume, the first sugar is snow-white with large grain. We have not seen it, but we expect to hear that this good result achieved will be followed quickly by a considerable increase of the sugar business from the rich lands of Bundaberg.

Correspondence.

GILL'S PROCESS.

THE TRIAL AT ZEELANDIA.

Demerara,

3rd April, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

I notice, in your magazine for March, a letter from Mr. Gill, concerning his process and the trial made of it in this colony, in which he accuses me of various delinquencies. Will you be kind enough to set right a few of his statements?

1st.—Mr. Gill says: "Being aware that Mr. Bellairs is at least a sceptic as to the value of my process, I succeeded in obtaining the presence of Mr. Stephenson, who is the owner and manager of that extensive estate, Goedverwagting; and also of Mr. Charles Williams, who is the chemist on Plantation Bel Air."

Mr. Gill did not ask Mr. C. Williams to be present at the trial of his process. I succeeded in obtaining his presence.

2nd.—Mr. Gill says: "I have reason to believe that Messrs. Stephenson and Williams, being satisfied with such a result, left Mr. Bellairs uncontrolled by their presence."

I notice that Mr. Gill does not actually assert that those two gentlemen were satisfied. I do not think they were. Mr. Williams was present during the third day's trial, but Mr. Stephenson's business would not admit of his making a longer stay. I have not heard, and do not expect to hear, that Mr. Stephenson is working Mr. Gill's process on that extensive estate, Goedverwagting; nor have I heard that Mr. Gill has asked Mr. Williams to publish his opinion of the process.

3rd.—Mr. Gill asserts that I constructed a report myself, "which the other two gentlemen reject."

I never have seen the report referred to, and do not know where it was published. I, of course, wrote a letter to my "generous

employers," and they may have seen fit to draw up and publish a report from it; but the other two gentlemen never rejected it, and I do not suppose that they have ever seen it.

4th.—Mr. Gill says: "Mr. Bellairs now felt free to realise his confident assertion that my process 'is capable of being modified and converted into a valuable system of sugar manufacture, possessing as it does unmistakeable elements of success.'"

I never asserted anything of the kind. The assertion was made by an anonymous writer of an article in a local paper called the "Royal Gazette."

5th.—Mr. Gill makes me say that "I limed the syrup, copper wall, and in fact the juice in all its stages, and have made some sugar but it is a nasty, dirty grey, sticky mess, most difficult to cure."

What I wrote was, "I made the further experiment of Gill's process,"—*i.e.*, to make sugar by Gill's process of our usual quality by trying the effect of bleaching the juice by sulphurous acid fumes and by not using sand. "I passed the cane juice through the sulphur box and mixed the juice from the megass guiding mill in the usual way. I did not use any sand in the separator tank. I ground 30 clarifiers (22,800 gallons). The cane engine ground much faster on the second trial than on the first.

The juice behaved just as in the former experiment, but was of course a much better and brighter colour. I added to each clarifier, "that is after the juice had left Mr. Gill's tank," three pints of lime (equal to 12 oz.), I added that amount because I considered that juice treated with sulphurous acid takes about three pints more than juice run direct into the clarifiers. The juice boiled well in the copper wall and looked clean and nice, the syrup was rather milky. When the syrup was taken into the pan it boiled rather heavily, and at 9 p.m., when grain should have appeared, the sugar had boiled down into a thick viscid sling of a good light yellow colour and quite clear but with no symptoms of a crystal. After waiting another half hour in vain, I put into the pan nine buckets of strong lime and water and obtained

crystals at once. I *then* added lime right through to copper wall and syrup boxes. The grinding had finished and there was no juice left in the clarifiers or tank. We made seven hogsheads of sugar (numbered 28 to 34) and took 3259 gallons per hogshead at least. I cannot give exact particulars because I had to strengthen the grain by using 800 gallons of syrup made by the usual process. These 800 gallons were taken into the pan after all the syrup made by Gill's process was boiled. The crystals in the pan, before the introduction of these 800 gallons, were so small as to have rendered the sugar nearly unsaleable. The sugar weighed, nett, 13,196 lbs., or .578 lbs. per gallon. The cane juice polarized an average of 1.32 lbs. of sugar per gallon, and the glucose .135 lbs. per gallon. I do not know what was the cause of the failure of the second experiment—whether it was the use of the sulphurous acid gas or the absence of sand. Mr. Williams thinks that the partial success of the first experiment was entirely due to the fact that, by chance, the cane juice treated on that occasion was singularly pure, and that the process showed itself incapable of defecating cane juice of average impurity.

6th.—Mr. Gill says that it is a significant fact that no attempt was made to utilise the drainage from the centrifugals. He implies that the drainage is another liquor, not molasses, and also implies that I allowed the opportunity to pass without some attempt to decide its value. It was judged by us three to be a more crucial test to ship the puncheons containing the drainage to England, where it could be examined, and the fact determined as to whether it be molasses or not. The "generous employer," on its receipt, had an opportunity to exercise his own discretion as to its value. The smallest pan at Zeelandia is an eight-ton pan, and to reboil the drainage of $10\frac{1}{2}$ hogsheads of sugar in an eight-ton pan was, properly, judged not "convenient."

Mr. Gill awards unmerited abuse to inevitable failure; he distorts statements, and suppresses facts. He says that we made $10\frac{1}{2}$ hogsheads in a day and a half, but never mentions that the estate on which his process was tried makes, by the ordinary process, from 80 to 100 hogsheads per week.

He says that by his process we made 54 per cent. on the polariscope readings; but he does not mention that, in the ordinary process, 60 per cent. is a by no means extraordinary result. He says that his sugar was valued at 31s.; but he suppressed the date, and does not give the quotations of the sugar ordinarily made by the old system, on the same day. Our usual sugar is worth at least 2s. 6d. per cwt. more than Mr. Gill's sugar is worth.

I have now tried his process three several times. I do not say that it contains "unmistakable elements of success," neither do I say that the principle of defecation adopted by Mr. Gill is "perfectly useless"; but I do say that Mr. Gill's apparatus is crude, and that many modifications are absolutely necessary before it can be worked at all in a practical way. I doubt if his process will ever give the return obtained by "the old, worn-out treatment of lime and the sulphur-box," and I am sure that no sugar maker will again experiment with the process without repenting. He will be burdened with hosts of amateur directions; he will then make a failure, and will be subjected to venomous abuse, and will have to practice the French ideal of politeness—"a man who knows all about a subject listening patiently to another who knows nothing about it."

Yours truly,

L. BELLAIRS.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

No applications for patents relating to the manufacture of sugar this month.

ABRIDGMENT.

3681. JAMES HORNER, of 21, Gibson Street, Leeds, Yorkshire. *Improvements in sugar cutting machines.* This machine consists of a stand or frame, with a tray or table, on which are fixed bearings carrying a head provided with cutters. These cutters are raised from the table by means of a spring, and are brought down on to the sugar on the table by a suitable lever, worked by hand or in any other convenient manner.

AUSTRIAN.

(Patents granted during December, 1879.)

4082. F. TEICHMANN, of Sassin, and A. GAWALOOSKI, of Brünn. *Purifying sugar juice and solutions without animal charcoal.*

BELGIAN.

50955. S. S. HEPWORTH. *Modifications in centrifugal apparatus for separating liquid matter from solids.*

50959. WEGELIN and HUBNER. *Modifications in filter-presses.*

FRENCH.

133518. LEFÉVRE & SON and DENIS, of St. Quentin. *A water distributor for mixing and macerating pulp, applicable in sugar works.*

133593. MESSRS. SCOTT & OGILVIE. *Improvements in purifying saccharine substances.*

133650. WEINRICH. *Extracting sugar from molasses by means of saccharate of lime, and apparatus belonging thereto.*

GERMAN.

9727. SEYFFART, of Berlin. *A continuous filter-press, with absolute lixiviation.*

9791. W. KNAUER, of Osmündi, near Gröbers. *Improvements in his method of purifying the waste water of sugar and other works.*

9861. J. KROOG, of Halle-on-the-Saale. *A filter-press.*

9877. O. NOTHDURFT, of Atzendorf, near Förderstadt. *A controlling and reducing apparatus for the waste juice of sugar-works.*

9991. MARKY, BROMOVSKY, & SCHULZ, of Prague. *A diffusion-vessel for sugar-works.*

SPANISH.

119. J. WEIBEL, of Geneva. *Apparatus for concentrating syrup; applicable to other purposes.*

157. W. R. CLEMCHORST, of New Jersey, and A. A. GOUBERT, of New York. *A centrifugal apparatus for purifying sugar.*

160. J. W. DECASTRO, of New York. *Defecating and refining saccharine substances.*

181. A. DE LA MUELA Y GUECO, of Havana. *A machine for extracting cane-juice.*

197. G. A. HAGEMANN, of Holland. *Defecating cane-juice.*

213. J. F. C. FARQUHAR and J. B. MACFARLANE, of Long-acre. *Apparatus for heating and purifying sugar.*

249. G. & F. LOEWIG, of Dresden. *A process of purifying beet and cane-sugar juice, and of obtaining sugar from residues containing sugar.*

350. G. C. W. BELCHER, of St. Louis (U.S.). *Filtering sugar solutions, and apparatus employed therefor.*

414. A. LABARRE, of Montreuil (France.) *Applying alkaline sulphites and bisulphites for decoloring and defecating sugar-juice, syrup, &c.*

417. P. FAURE, of Limoges (France.) *Improvements in sugar-cane mills.*

SWEDISH.

59. E. LANGEN. *A centrifugal apparatus for refining sugar.*

AMERICAN.

226255. JOHN B. THOMS, of Baltimore, Maryland. *Apparatus for concentrating sugar-cane juice.* This is a method of heating the liquor in the vacuum pan. The apparatus consists of a single furnace, provided with valved apertures to admit air into the combustion chamber. The only outlet for the heat is through a pipe (or pipes) communicating with a coil (or coils) in the vacuum pan, and passing thence to a chimney or exhaust apparatus. The pipes are protected against the entrance of ashes, soot, and the like, by means of network placed at the ends uniting with the furnace.

226271. ARLOND H. BLAISDELL, of Vineland, New Jersey, assignor to James H. Wells, of same place. *Centrifugal machine.* The screen of this machine is formed of a number of separate rings arranged one above the other, with intervening spaces formed by lugs on one side of the machine. The outer edges of these rings are preferably notched or waved to facilitate the escape of the liquid through the outer perforated shell into the fixed casing. The rings are split at one point on their circumference, so that they may be expanded to fit tightly against the perforated shell.

226300. THOMAS GANNON, of Jersey City, New Jersey. *Means of cooling water for evaporating and distilling apparatus.* In this arrangement a tank supplies water to the condenser of the evaporating apparatus and to a cooler below the condenser. This cooler consists of a series of surpentine passages, arranged in a barometric column of the condenser, by causing these pipes or passages (which are contained in a cooling vat supplied with water from the above tank) to connect at their upper ends with the lower end of the condensing chamber, and at their lower ends with a barometric leg or column dipping into a cold well, at a suitable distance below the condenser to make the barometric column effective. The water is fed into the tank from a well, by means of a pump, and is continually flowing into the cooling vat, the overflow pipe from which vat leads into a cylinder provided with a perforated plate near the top, which causes the water to fall in a spray in this cylinder, into which cold air is forced to cool the spray, which is then led into the first feeding well. The overflow from the cold well into which the barometric leg dips leads also into this first feeding well.

226395. ADDISON L. FOLGER, of Sumner Indiana, and A. SMITH FOLGER, of Washington, Iowa. *Evaporator.* This apparatus is constructed principally

as follows:—Two pans are arranged above the flue of a furnace, one after another. The first is provided with adjustable scum collectors and directors, which conduct the scum to a convenient place for removal; and this pan is provided with an opening and a pipe to lead the concentrated juice into a hot filter before it passes into the second pan, where it is further concentrated. In order to prevent the heat from impinging with too much force against the point where the two pans meet, a plate of metal, lined with some non-conductor of heat, protects the joint. Suitable dampers are arranged to regulate the heat.

226398. CLINTON FURBISH, of Brooklyn, New York. *Process of manufacturing glucose.* This is a compound process, consisting firstly of pearlizing the grain by a dry clipping and cracking process, by which the hulls and hearts of the kernels are separated from the hard starchy portions; secondly, the reduction of these starchy portions to a pulpy mass; and, thirdly, the conversion of the starchy matters of this mass into glucose or sweet liquor.

226434. JOHN F. WOLFF, of Chicago, Illinois, assignor of one half of his right to Jacob W. Mower, of same place. *Process of manufacture of glucose.* This invention consists in introducing into one or more, or, preferably, all the steps of mashing, boiling, and neutralising currents of oxygen, which at present can most readily and cheaply be done by forcing currents of air through the mass under treatment.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To MAY 15TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	80 ..	61	127 ..	123	120 ..	107
Liverpool ..	52 ..	56	94 ..	119	86 ..	87
Bristol	4 ..	6	20 ..	24	19 ..	21
Clyde	53 ..	51	108 ..	112	88 ..	93
Total ..	189	174	349	378	313	308
Increase..	15		Decrease..	29	Increase..	5

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST APRIL, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrept's.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
157	137	33	66	5	398	391	393

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST APRIL, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrept's.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
975	306	30	291	188	1790	1758	1639

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	270,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	385,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	60,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,875,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

There has been a more satisfactory demand for both raw and refined sugar during the past month.

Holders of useful refining sugars having confidence in the market kept back supplies, so that whenever pressing wants had to be filled up prices ruled higher.

Grocery and low sugars have been neglected, prices in some cases giving way. The stock of the latter description is out of all proportion to the demand.

Towards the close the market has relapsed into a quieter tone, though without change in values.

The imports in 1880 compared with those in 1879 show a decrease of 28,900 tons against a decrease of 1200 tons shown last month.

The deliveries which last month showed an increase of 370 tons, now exceed those of last year by 4600 tons.

The stocks of sugar on the 15th May were 14,800 tons in excess of those of the same date last year, and 36,900 tons more than on the 1st January, 1880.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 21s. 6d., to 22s. 6d., against 21s. 6d. to 22s.; good to fine grocery, 23s. 6d. to 25s. 6d., against 24s. to 26s.; Martinique crystals, 25s. 6d. to 26s. 6d., against 26s. to 27s.; No. 12 Havana, 24s. 6d. to 25s. against 23s. 6d. to 24s.; fair to good refining Cuba Muscovados, 23s. to 23s. 6d., against 21s. to 21s. 6d.; middling to good brown Bahia, 20s. to 21s., against 19s. to 20s.; good to fine Pernambuco, 21s. to 22s., against 20s. to 21s.; Paris loaves, 27s. to 27s. 9d., against 26s. 3d. to 27s.

THE SUGAR CANE.

No. 132.

JULY 1, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

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THE SELECT COMMITTEE ON SUGAR INDUSTRIES.

Want of space compels us to postpone our abstract of the further evidence taken within the last few days. The opposition have endeavoured to retrieve the failure of Sir Louis Mallet's evidence by calling Mr. Giffen, of the Statistical Department of the Board of Trade. A similar failure has been the result. Mr. Giffen's figures confirm previous witnesses most fully on every point, and very much strengthen their case; and when he gets into the region of theory, surmise, or personal opinion, he breaks down quite as completely as Sir Louis Mallet had done.

Mr. Giffen admits that bounties exist, and that the disturbance is more serious to us than any benefit we get by them. He admits that our acquiescence in the bounty is very much the same as if a tax were put on British raw and refined sugars, while foreign sugars were admitted free. When he is asked how he would propose to deal with foreign export bounties, he says British producers should meet the difficulty by reducing the wages of their workmen. On being pressed on this point, he added that the British producer should also reduce his profits. This has been done in the case of loaf sugar, until profits and loaf sugar makers have both disappeared.

The following is a good question, and a very straightforward answer :—

Question.—" You think reducing the wages of the working men and keeping on the bounty is better than taking off the bounty and keeping the wages as they are ? "

Answer.—" Yes."

THE FOREIGN EXPORT BOUNTY SYSTEM.

GREAT MEETING AT THE MANSION HOUSE.

The following is a condensed report of the proceedings of a public meeting of Producers, Merchants, Manufacturers, and Workmen, held in the Mansion House, by the kind permission, and under the presidency, of the Right Hon. the Lord Mayor, Sir F. Wyatt Truscott, on Friday, May 28th, 1880.

The speech of so eminent a lawyer and so undoubted a free-trader as Mr. Arthur Cohen, Q.C., M.P., cannot fail to impress those who still cling to the idea that there is something contrary to free trade or to our commercial policy in countervailing an export bounty. Mr. Lubbock's speech deals exhaustively with the subject, and appears to be unanswerable.

The circular convening the meeting was evidently drawn up with great care, and puts in a small compass the arguments in favour of a countervailing duty.

The great value of this meeting, however, is in the fact of its having been a very remarkable success in every way. The large hall of the Mansion House was crowded. Every important firm of sugar merchants, manufacturers, brokers and dealers was represented. The resolutions, the terms of which should be carefully studied, were carried without a dissentient voice. We are glad that so many members of Parliament were present. They could not fail to be impressed with the importance and unanimity of the meeting, and the soundness of the arguments.

The circular convening the meeting contained the following paragraphs :—

Export bounties constitute an attack by foreign Powers on British capital and labour, by which natural sources of production are injured and restricted, and British producers denied free competition even on their own markets.

Acquiescence in this attack would be inconsistent with our commercial

policy, which demands equal competition on British markets for all producers, British and foreign, by which alone the permanent interests of the consumer can be secured.

A duty to intercept the bounty would restore free competition, by removing the bounty from the market and securing it for the revenue, and would therefore be a tax on bounties, not on sugar. The operation of such a duty would leave the price of sugar exactly what it would be were there no bounty and no duty; and would, therefore, immediately attain the end which long continued negotiations on the part of successive administrations have sought but failed to secure. The result, therefore, would be the same, as regards the consumer, whether the bounty were countervailed by duty or abolished by treaty; but if countervailed, the bounty, instead of being lost, would be accepted for the revenue to the relief of taxation.

Equal competition on British markets is, in other cases, secured for British producers by means of countervailing duties, which are levied for that object and not for revenue purposes.

The object in view is solely to obtain freedom of competition for all the world on our *national* markets, and is, therefore, in no way concerned with the foreign protective tariffs which hinder or prohibit our exports to *foreign* markets. Hence no question of reciprocity or retaliation can possibly be involved.

Liberal and Conservative governments have vied with each other in their efforts to obtain the abolition of these export bounties. Whether removed by foreign governments or excluded from our markets by our own Parliament, the result to the consumer is identically the same. Eighteen years of negotiations having failed to remove them, the time has now come to do so by other means; and, while gratefully accepting as revenue any bounty foreign governments may give us, to withhold its operation from the home markets.

The Egyptian Hall of the Mansion House was crowded with Members of Parliament, Merchants, Manufacturers, Brokers, and others connected with the sugar trade.

Mr. G. H. CHAMBERS, Chairman of the London and St. Katherine's Docks Company, who was warmly received, moved the first resolution, which was in the following terms:—"That, in the opinion of this meeting, free-trade in British markets can only exist, and the permanent interests of the consumer be thereby

secured, when all producers, British and foreign, are placed on terms of equal and unsubsidized competition." He said: The cause of justice has been frequently advocated within these walls, but on no occasion, I venture to think, has a stronger case for justice ever been brought forward than the one which we are here, my Lord Mayor, to-day to advocate. (Cheers.) We do not come to ask either favour or protection. What we ask for, and what we have a right to obtain, is that which is supposed to be dear to every Englishman,—I mean that we should have fair play. (Hear.) I was very much surprised a few days ago by reading in the *Times* newspaper words to the effect that information was very much needed on the subject of foreign sugar bounties. Well then, considering that we have had a Committee of the House of Commons sitting upon the question, and the proceedings of this Committee reported in the daily press, I thought very naturally that the information which the *Times* appears to be ignorant of was in the hands of the general public. (Hear, and laughter.) However, to make sure, I will now endeavour to put the circumstances of the case before you in the broadest manner possible, whilst at the same time I will not go into matters of detail, but simply confine myself to stating the case as plainly as I can, in order that all may understand it. (Hear.) We all know that the best source from which sugar can be obtained is the sugar-cane. It is true, no doubt, that there are, to a certain extent, some useful substitutes for that valuable commodity, but nevertheless the sugar-cane is the natural source to which we should all look from whence to derive our supply of sugar, and our colonies have supplied us with the finest and best quality. We know, also, that in those colonies—especially in the West Indies—the planters have had to overcome many difficulties. There was, for instance, the emancipation of the negro slaves in the islands under British rule. That was one difficulty they had to contend with. Another exists at the present day, and that is, they have to contend with slave-grown sugar in other parts of the West. Notwithstanding all that, as I have said before, our own colonies can supply us with the best possible product, and in abundant quantities. (Hear.) Such a

state of things is owing to the land possessing great natural advantages, and to the skill and energy of the people. These advantages would, however, seem to avail but little under the present unfair manner in which we are allowed to be treated by producers of sugar on the continent. (Hear.) Let us just look at the loaf sugar refiners. We know that they possess every advantage that skilled labour can give them, together with a magnificent supply of the raw material, but still the colonists and the British loaf sugar refiners are deprived of what should be the results of those natural and other advantages, and find themselves undersold in their own markets. Such being the case, we naturally look around to see what has brought it all about. And what then do we find? We find that their markets are taken from them in consequence of supplies coming forward under heavy subsidies given by bounties, under the name of drawbacks. (Hear.) There can be no worse form of protection than the allowance of a bounty. It goes beyond any special duty, and moreover it is indefinite; and being so, we do not know to what extent we have to contend against it. (Cheers.) We know most clearly that the effect of subsidised importations is only advantageous, if advantageous at all, to the consumer, just so long as there is a surplus in existence; but the moment the surplus is taken away, and the consumer has to rely for a supply of his sugar, or whatever it may be, on subsidised importations, then the evil is seen directly. The price of the article rises materially; and thus it is that it is infinitely more advantageous to the consumer to have all the sources of supply open than to have a subsidised industry resulting in a monopoly. (Hear.) I am old enough to remember the earlier discussions which took place in this country upon the question of free trade, and I can say from my own knowledge, judging from what I then heard and now know, that if Richard Cobden were still alive we should have him ranged on our side—(cheers)—because the principle I have heard him uphold is that where you could naturally produce in the best and cheapest manner, there you should be allowed to produce, without being in any way trammelled by fiscal arrangements. (Hear.) That was the true principle of free trade laid down by the late Mr. Cobden.

That same principle of free trade was adopted by Sir Robert Peel, and when another principle of free trade was being promulgated, namely, to buy in the cheapest and sell in the dearest market, and he was taunted in the House of Commons for not following that principle in all cases, he justly retorted that, treating free trade on that ground, it was sometimes necessary to make exceptions. Mr. John Stuart Mill said, if you do not make exception sometimes, you may be buying stolen goods. (Hear, and laughter.) When we say it is right to countervail this bounty, by any means, to prevent its damaging operation on our markets, I am sure that we are going on the true principles of free trade. (Hear, hear.) We know that successive Governments, both Liberal and Conservative, have been endeavouring to do away with the present pernicious system, and with good reason too, because it does not involve a question merely affecting colonists or refiners. The production of sugar is a great labour question, and affects the interests of many trades. There is not only the wellbeing of the sugar operatives pure and simple, connected with the production of sugar, dependent upon a proper settlement of the question at issue, but there are also the interests of the coopers, coppersmiths, engineers, chemists, ship-owners, carriers, and other bodies of men, also to be taken into consideration. All these interests being involved, I say therefore it is impossible to injure the sugar trade of England and her colonies without at the same time causing great and general distress amongst the masses of the people. (Cheers.) Such has been the result already owing to foreign bounties, and if something be not speedily done to counteract their deleterious influence, the mischief will be more widely spread and more keenly felt every day. I hope most sincerely that the Government will now, without delay, take this matter in hand, and apply a remedy that will be found to be efficacious, and not have it said of them that they allowed this country to be unjustly deprived of a valuable industry, the bread taken out of the mouths of the working classes, nor allow the continuance of a system, the result of which must be to render this country dependent on a giant monopoly for one of the necessities of life. (Loud cheers.)

MR. JAMES DUNCAN (Chairman of the British Sugar Refiners' Committee), who was greeted with much applause, said : My Lord Mayor and Gentlemen, it is with feelings of the greatest pleasure I rise to second the resolution which has been so ably moved by the gentleman who has just addressed you. The question now before us is, I take it, one of paramount importance to all classes of the community. (Hear, hear.) We wish to see a large supply of sugar from all parts of the world on our markets. (Hear, hear.) That, however, we shall never be permitted to witness so long as foreign bounties on exported sugar prevail. What we shall see, though, is a stoppage of all sugar supplies except from those European countries where bounties obtain. That certainly is not what is required. All Mincing Lane men know very well that within a very few days, the price of French refined sugar was 26s. 9d. per cwt., and at that very time the French refiners were actually paying 26s. 6d. per cwt. for raw sugar. It is scarcely necessary to tell any one that it is impossible for a refiner to sell in the legitimate way of trade refined sugar at the same price he pays for raw sugar. It is to get rid of such a system that the agitation against foreign bounties has been prosecuted in this country. That agitation is based upon a sound principle ; and in proof of that, I may say it has been the means of doing a large amount of good. By this agitation the bounty system has been kept in a great measure in check, and we are determined to continue in the course we have hitherto pursued until such time as we see our demands in the interest of free trade acceded to. (Cheers.) The foreign bounty system not only does a great amount of injury to British trade, but also has the effect of stopping entirely what might be, but for it, a great British industry. I myself was deeply interested in the cultivation of sugar-beet in England, and I discovered that that description of beet can be quite as well cultivated in this country as in France, or, in fact, anywhere else ; but it is quite impossible to carry on that industry against the foreigners, when they receive, as export bounty, as much as two pounds, three pounds, and sometimes four pounds sterling per ton on their produce. (Hear, hear.) The bounty system not only pre-

vents the growing of sugar-beet in Britain, but it also has the effect of materially curtailing the propagation of the sugar cane in her colonies. Of my own knowledge, I know several colonies where magnificent canes can be grown, but the people of those colonies will not expend money on their cultivation so long as the foreign bounties are allowed to paralyze our home and colonial sugar industries. It is time, then, I think, that something was done to neutralize the ill effects of these bounties. (Hear.) We have been now carrying on negotiations respecting these bounties for many years past with foreign Governments, but apparently without getting any further in the matter, and we are now looking to our Government at the present time in order to know what is to be done respecting these bounties. The sugar refiners of Great Britain are anxious to carry out the principles of free trade. (Cheers.) We do not want to see sugar taxed, we want it free. Both the Liberal and Conservative Governments of this country have negotiated for the abolition of foreign sugar bounties for years, but all their negotiations have come to nothing. We are just as far forward in that direction now as we were ten years since. That being the case, the question naturally arises, "What course are we to adopt?" The plan we propose is, that a countervailing duty, to the amount of two shillings per cwt., should be placed on all bounty-fed sugars coming on British markets. (Cheers.) That would be a mere trifle; it is less than a farthing per pound. Small as it is, however, we believe that as it would show the admission of the principle it would be quite sufficient for our purpose, as it would have the effect of at once causing foreign Governments to alter their system and allow refining in bond, and charge the duty on sugar instead of on roots, or juice, or raw sugar, as is done at present. (Loud cheers.)

THE LORD MAYOR: In the absence of Dr. Cameron, M.P., I will now call upon Mr. Edward Clarke, Q.C., to support the resolution.

MR. EDWARD CLARKE, Q.C.: who was received with loud and prolonged applause, said: My Lord Mayor and gentlemen, I was particularly anxious to be here to-day and take part in this meeting, because I may state that I am well satisfied that the cause, to

support which the meeting has been convened, is eminently just. For some reason or other, however, I am afraid the desire to levy a countervailing duty is not fashionable. There are a good many of my friends with whom I have discussed the question of the sugar bounties, and who are in favour of a countervailing duty being levied, yet who are afraid to come forward because they imagine that in some way it violates the principle of free trade. (Hear, hear and laughter.) I think it is a good thing that the first resolution should be an affirmation and not a denial of the true principles of free trade. (Hear, hear.) I attended this meeting not only because I believe that the well-being of a great national industry is at stake, but because the question involves a sound principle of commercial legislation. The principle we have met here to uphold is the principle of equal trade. Without equality of competition there can be no true freedom, and because that principle is at the bottom of this agitation, it is of great importance. One has been told, when speaking about the decrease of a branch of the sugar industry of this country, "Well, the mischief is done, you cannot restore the trade which has disappeared, and therefore there is no use in taking any action in the matter." This is not the place to go into details with respect to a statement of that kind, but the answer to it is two-fold. In the first place, it is not correct to say that the trade has been destroyed in the sense of being so irretrievably injured that it cannot be revived. (Hear.) It has been checked, and refiners and producers have been seriously injured; but there is no reason why, if the produce of cane sugar were not unduly handicapped by foreign bounties on the beetroot, there is no reason, I maintain, why the sugar industry should not flourish and revive, and be the means of employing large numbers of workmen and immense capital as in former years. (Hear, hear.) But even if the objection were a true one, if it could be said with accuracy that the effect of these bounties had been to entirely destroy the whole of a once flourishing portion of English trade, and if that should be true, I hold that, as the adoption of a countervailing duty would be the means of bringing back the prosperity to that particular branch of trade which it possessed in

times gone by, it would be the strongest reason possible for the Government to recognise the principle, so as to provide against the possibility of a recurrence of mischief which they had hitherto been unable to remove. (Cheers.) If one industry is extinguished by means of foreign bounties, another industry may to-day or to-morrow follow suit in its turn, and it is quite time, then, whilst recognising to its fullest extent the principle of free trade, we should call on our Government to devise some means to relieve this particular trade of the mischief which has been done to it. (Cheers.) The grievance, my Lord Mayor and gentlemen, is an admitted one. It is not for a fanciful or a sentimental reason merely that successive Governments, for the last 16 years, have employed your representatives in foreign courts to make suggestions having for their object the stoppage of the bounty system. (Hear.) There is no commercial authority in this country of any standing that does not state that bounties do exist in France, Belgium, Holland, and Austria. It is not only admitted by the authorities in France, but the most circumstantial statements are made of the amount of the bounties. You will see, therefore, that the fact is an undoubted one. We know that it does exist, and the French authorities are equally well aware of it. It is not alone the sugar trade in England that complains, but also the same industry in France. In the latter country, they complain because they are over-topped in the matter of bounties by the Austrians, the effect of which they say will be to drive them out of the markets. The matter of the foreign bounties is a question that cannot be allowed to stand still. (Hear.) Somehow or other, it must be dealt with, and that speedily; unless the Government is prepared to say, we are quite helpless in the matter, and cannot do anything to prevent foreign nations injuring our commerce or trade. (Loud cheers.) The French producers are now seeing how they can best bring about an increase of bounty, because they say we are beaten by Austria in the way of bounties, and so we shall have to have an increase of our own. And the French will be beaten unless they adopt some such plan, and it is not very likely they will allow themselves to be worsted without making an effort. The result,

then, as I foresee, will be that when they have got an increased bounty, they will glut the markets with cheap sugar. What is one to do, then, under these circumstances? Surely not to sit down with folded hands, to see a great industry destroyed, capital deteriorate, labourers sent away to seek employment in a foreign land? No! a remedy must be sought for this evil, and it is full time it was sought and carried into effect. (Cheers.) The remedy is a simple one. We have it already in operation for the protection of certain industries, in the shape of certain surtaxes upon articles coming from abroad, and which are also produced here. (Hear, hear.) There is, for instance, a duty put upon spirits imported from abroad superior to the excise duty paid upon spirits manufactured in Great Britain. That was put on for the express purpose, not of excluding the foreign spirit, but protecting the English producers from being unfairly handicapped; and that which has been adopted with respect to one interest can be brought into play with regard to another; moreover, it is the obvious and reasonable and just way of meeting the difficulty under which we labour at present. (Cheers.) There is really no practical objection to the introduction of a countervailing duty, although, in the Committee over which Mr. Ritchie presided with the greatest ability, all sorts of suggestions were made as to the difficulties which would be experienced in endeavouring to impose surtaxes on the produce from different countries. Those difficulties, however, were soon disposed of by one of the most, if not the most experienced man of the present day, I mean Mr. Lilley, the Surveyor-General of Customs. (Cheers.) That gentleman said most emphatically that there would be no difficulty in the way of levying the tax. There is nothing antagonistic to the principles of free trade in putting on a countervailing duty. What we want is that all the countries of the world shall have fair play and free scope for the industries of their people. (Cheers.) When bounties come on, it drives our people off their own markets, by a bribe given to the foreign producer, or, in other words, by the Government paying part of the price of production; and the effect of that is that it can come cheaper into English markets than on foreign markets, and be sold at a less

price than sugar made at home in this country. That is forcing it below the natural market prices. (Hear, hear.) Now, what can be the result on the other side, supposing a countervailing duty is imposed, equal in amount to the bounty given by foreign Governments upon exported sugar? Why, the bounty will be taken off; for I believe that the mere threat of the tax will be probably sufficient to deter foreign Governments from endeavouring to ruin British trade by keeping on, under such circumstances, the bounty. If then the bounties were taken off, the soil and the people of this country would be left to make the best they could of their own natural capabilities. (Hear, hear.) On the other hand, even supposing the bounties were still continued—which is very unlikely—the people of England would then be on an equal and fair level with those of the nations abroad, whilst the Government would put into its pockets the whole amount of the sugar bounties. (Cheers.) It is not in the interest of a particular trade only that I was anxious to speak here to-day, but it was in the interests of fair commercial dealings between nation and nation; and I commend most earnestly to the acceptance of this meeting the resolution which has been read. (Loud cheers.)

Mr. ARTHUR COHEN, Q.C., M.P., who, on rising to address the meeting, was received with cheering, after explaining the reason of his being present at the meeting, continued: Many persons now speak in favour of free trade, and are more or less conversant with its principles; and I am delighted to find that my political opponents have at last become fully aware of the truth of the principles of free trade. (Hear, hear.) But I must be permitted to add that I think there are many more people who speak in favour of free trade than there are who understand its true principles; and that those who are opposed to any action being taken in order to remedy what has proved to be, a grave, serious, and extensive injury to a whole trade, misapprehend the fundamental principle of free trade. (Loud cheers.) That is a statement I am prepared to prove. (Hear.) My proposition is, that those who think that Her Majesty's Government ought to take no action in the matter now immediately before us, because any

such action would be inconsistent with the principles of free trade, gravely mistake those principles. (Hear.) I think this capable of proof. The great principle of free trade is this: that the products of every country should be allowed to be forwarded and exchanged, and bought and sold, without any artificial or State regulations. (Cheers.) It is said of protection—and I think, truly said—that it has one characteristic and essential vice, namely, that it favours a particular class to the disadvantage and injury of the consumer. Now, some of our friends feel this difficulty with regard to the foreign sugar-bounty question. They say that after all the consumer gets his sugar cheaper by the means of these foreign bounties than he otherwise would. Here is my answer to that. Why, I would ask,—if it were true that these bounties are a benefit to the whole country,—how comes it, I say, that every Government, whether Liberal, Radical, or Conservative, that we have had for many years past, declare “the present system is extremely bad, and we will do our best to alter it, only we don’t know how?” (Loud cheers and laughter.) No Liberal or Radical Government would venture to say, “we will favour a particular class or trade, although the general community will be injured by our so doing.” You have, then, this fact, that Liberals, Radicals and Tories deplore the existence of these subsidies granted by foreign States, because they do an injury to the whole British community, and yet do nothing to remove the evil, although the bounties might be rendered innocuous without, in my opinion, in the slightest degree interfering with the principle of free trade. (Cheers.) Undoubtedly it does conduce to the advantage of the whole community that the products of various countries should be allowed to exchange at what Adam Smith calls the natural price. But it is not to the benefit of the whole community that the consumer should get an article at a lower cost than its natural market price. It is for the benefit of all that every artificial interference, whether for the purpose of raising or lowering the price of a commodity, should be removed. (Hear, hear.) But it is not true that any political economist—that is to say any political economist who understands his science—would uphold the doctrine, that it is advantageous to

the whole community for the consumer to be allowed to purchase a product at a lower rate than its natural price. (A Voice: "What is the natural price?") I am glad this question has been asked, and in answer to it, I think I cannot do better than give the definition which is due to the great founder of modern political economy—Adam Smith. (Hear, hear.) He, in effect, holds the natural price to be that price at which every article would sell if home and foreign trade were not trammelled with artificial fetters. Or, in other words, the price at which they would sell if there were free and unrestricted competition. The fundamental principle of free trade asserts that the wealth of countries will be best furthered by allowing the products of different countries to be sold at their natural price, but it is not in the least inconsistent with that principle to hold, that the community is not on the whole and in the long run benefited, by the consumer being able to purchase an article of consumption at a lower price than its natural market price. Now this is the case with sugar, in consequence of the bounties given by France and other Governments to those who export the article, and therefore it seems to me that those who acknowledge the principle of free trade as a fundamental and well-established principle may, nevertheless, consistently support the present cause. I have shewn how the justice of your cause can be supported by strong argument. (A voice: "Truth requires no argument.") With that observation I do not agree. If all men were infinitely wise, truth would require no argument; but in the present state of the world, fools would have an enormous advantage over men who are wise and who are diligent in the acquisition of knowledge, if truth did not require any argument. (Cheers.) In the long run and in the end, no doubt, truth will prevail, but it rarely gains the victory without a struggle, in which the best, the wisest, and most earnest men are bound to take a part. (Renewed cheers.) Now let me revert to the immediate question at issue. It is said by some that as the countervailing duty is proposed to be equal to the amount given in the shape of bounties by the various foreign governments, there will be great trouble in ascertaining the proper duty to be levied, owing to the difficulty involved in finding out the country from

which the sugar has come. Some persons go even so far as to say that it would be impossible to find out its origin. This objection was, however, removed by the Surveyor-General of Customs, who said that no great difficulty had been experienced—before protection was done away with—in procuring certificates of origin. Again, there has been raised a cry about the difficulties to be overcome with respect to the “favoured nation” clauses. On this point however, I venture to say that no lawyer of much eminence will be found to declare that “favoured nation” clauses preclude our right to levy countervailing duties. Such objections as these are generally raised by the timid, but even supposing there were difficulties in the path which leads to right and justice, those difficulties should only mean things to be overcome. (Cheers.) And now, my Lord Mayor and gentlemen, allow me to congratulate you, and all who are here, that as the arguments which we have heard to-day have been forcible and convincing, there is good reason to believe, and strong ground for hoping, that something may be done to relieve the evils which have weighed down, and to avert the distress and calamity which threaten the very existence of an important trade, and consequently the interests and the prosperity of the vast body of men connected, directly or indirectly, with that important industry. (Loud cheers.)

The resolution was put to the meeting and unanimously adopted.

COLONEL COWAN (of Messrs. Cowan & Sons, Sugar Refiners)— My Lord Mayor and Gentlemen, after listening to the theory and the right application of free trade, so ably explained by previous speakers, it would be waste of time on my part if I were to offer any remarks with reference to the scientific application of the principles of free trade, as bearing on the question we have to answer. (Hear.) Before I proceed with the few remarks I have to offer, I wish in the most emphatic manner to disclaim any sentiments of protection or reciprocity. (Cheers.) Our desire is to be merely given fair play. We do not in the least desire retaliation or protection. (Cheers.) You, gentlemen, have just affirmed in a most unmistakable manner your adherence to the principles of free trade. I hope that whilst you support those principles you will also express your

abhorence of a system of foreign protection which is being pursued to the detriment of this country. (Hear.) You will no doubt also clearly indicate, and that without hesitation, what in your opinion is the proper means for bringing about the abolition of this protectionist scheme to which I have alluded. (Cheers.) With your permission, my Lord Mayor and gentlemen, I will now read the resolution which has been entrusted to me to move. It is "That, in the opinion of this meeting, foreign protection in the form of export bounties denies to British producers free trade competition even on their own markets; injures the legitimate interests of British capital and labour, and restricts the development of the natural sources of production." After referring to the negotiations for the abolition of the bounty, and alluding to the cultivation of beetroot in Ireland, Colonel Cowan concluded an eloquent speech as follows: I believe that in this Mansion House,—this dwelling-place of honour, this temple of fair play—there will, this day, be born that which will correct those evils which we are here to denounce with no unmistakable voice. (Cheers.) We ask you, my Lord Mayor, to use your great influence to help us in our appeal for justice. Gentlemen of the House of Commons, you have shown your interest in this matter, and I, on behalf of suffering industries, ask you to do your best to help us in the legislature. And last, but by no means least, you working men of England, who have been our fellow-labourers in the great cause of reform, and fellow-sufferers by this terrible foreign curse, we appeal to you to use your best efforts, your great intelligence, and the utmost vigour of your manhood to obtain justice. (Loud cheers.)

Mr. SAMUEL PETERS, (General Secretary of the Workmen's National Executive Committee for the Abolition of the Foreign Sugar Bounties,) who was received with loud cheers, said: My Lord Mayor, gentlemen, and fellow-workmen, I have been deputed to explain to this important meeting the views of the workmen dependent for their livelihood upon the home and colonial sugar industries, upon the question which has brought us together this day. My Lord Mayor and gentle-

men, what the workmen want is that the foreign bounties should be abolished, and I think I am not far wrong when I say that they are determined that they shall be. (Cheers.) It is now eighteen years since negotiations of various kinds have been going on between the representatives of this country and those abroad for the abolition of the foreign bounty system. They have come to nothing however. We have been put off by specious promises from time to time. We say then, that if these countries, after eighteen years of negotiations, still refuse to take off their unfair and obnoxious bounties it is high time that we took them off for them, by the simple plan of putting on a countervailing duty. (Cheers.) (A voice: And raise the price of sugar to 6d. a lb.) No, it would not. It would not be the means of enhancing the price of sugar one farthing a lb.; and, if it did raise the price of sugar one-fourth of a penny per lb. it would at the same time be a whole penny cheaper to the consumers, on account of the better sweetening properties of British sugar manufactured from cane. (Hear, hear.) Mr. Cobden, when speaking at Manchester on one occasion when free trade was being first agitated, said he did not care what the price of corn was so long as it was obtained at its natural price. The same argument holds good with respect to sugar, and no man with common sense or patriotic feeling would wish to get the proceeds of a manufacture in which his fellow-countrymen were competing with foreigners at a price lower than the natural one. (Hear.) If this country and her colonies had been given fair play, sugar would have been cheaper to-day than it is even with the aid of bounties given by foreign European States. (A voice: "Oh!") Perhaps the gentleman who keeps interrupting is an agent for "Say's loaves"—(cheers and laughter)—or is sent over here by the Austrian land owners. (Renewed cheers and laughter.) Another thing I can tell that individual who said that if there was a countervailing duty sugar would be 6d. a lb., is that if we thought that would be the case we should not be anxious for such a duty being levied, because the consumption of sugar would then be comparatively small, and, as a natural consequence, there would not be so much work required for its production as there is

at the present moment. (Hear, hear.) I should like just to read a few lines from the Oxford Cobden Prize Essay of last year, on the depression of trade. It says: "The trades of sugar growing and sugar refining are being ruined in England, not only by foreign duties but also by foreign bounties, which enable our rivals to sell their sugar in England below the cost of production, indemnifying themselves at the expense of their own tax-payers." There is no doubt that in so doing they are making a present to the English consumer; but it is a present of no great value to "him"—(hear, hear)—"whilst it is fatal to a thoroughly legitimate British industry, and it is given at the expense of the foreign tax-payers, as well as at the cost of much absolute waste. With such a present we can afford to dispense;"—(hear, hear)—"at any rate a succession of governments have shown this to be their opinion, by the frequent remonstrances they have addressed to foreign governments on the subject. If we could impose on foreign sugar a duty, exactly equivalent to the bounty it has received abroad, we should simply annihilate the effects of the bounty and restore a sort of virtual free trade." (Cheers.) "The foreign governments would be making a present to the English Government instead of to the English consumer. But, no doubt, they would soon cease to confer a bounty which would do no good to any of their own subjects." (Loud cheers.) Lord Derby said, not very long ago, that there could be no doubt but that if the foreigners once got the markets into their own hands the price of sugar would inevitably rise. And in that statement his lordship was perfectly correct. If these bounties still continue they will soon be masters of the situation; and, when they are, they will make the people of this country pay not only the cost of their bounties, but also a much larger price for their sugar than ever they did before. (Hear, hear.) The French, and the Belgians, and the Hollanders, are now struck by the Austrians, who have given a larger amount of bounty than either of the other three Governments. Such being the case, the struggle is now between a clique of Austrian landowners and the British workmen; and the British workmen, because they have right and justice on their side, will eventually win the day. (Loud cheers.)

Mr. MITCHELL HENRY, M.P., in supporting the resolution, expressed to the Lord Mayor and citizens of London the heartfelt thanks of the distressed people of Ireland, for the kindness, benevolence, and generosity which had been shown them. In reference to the growth of sugar beet in Ireland, he pointed out that it will never do for agriculturists or manufacturers to attempt to grow, or when grown to manufacture sugar beet into sugar so long as they are liable to be unfairly handicapped by bounties given by foreign countries.

The resolution was then unanimously adopted.

Mr. N. LUBBOCK said: I presume, my Lord Mayor and gentlemen, that it is owing to the fact of the position I hold, namely, that of the Deputy Chairman of the West India Committee, and consequently identified with the West Indian colonies, that I have been asked to move the third resolution, which runs in the following terms:—"That as diplomatic negotiations and treaty engagements have, for eighteen years, failed in their object to restore free trade competition in British markets by obtaining the abolition of foreign bounties on the exportation of sugar, it is necessary, in the opinion of this meeting, that this end should now be attained by the immediate enactment by Parliament of such a duty on bounty-fed sugar as shall, while insuring the free admission of unsubsidized sugar from all parts of the world, countervail the bounty, and make the policy of our long-continued negotiations efficacious." After giving a history of the negotiations and Conferences since 1862, Mr. Lubbock continued: I have so far drawn attention especially to the Conventions and Conferences which were from time to time being held; but an active correspondence between Her Majesty's Government and one or other of the European Powers had been going on almost incessantly during the past eighteen years; the object of which has been solely to secure the removal of export bounties. Conventions, Conferences, and correspondence have, however, all proved fruitless, and have demonstrated the impolicy of expecting other Governments to do for us that which we all along have had it in our power to do for ourselves, viz., to keep export bounties off

British markets. A few words now on the subject of these bounties: it was recently asserted in one of the newspapers, that the amount of these bounties had never been ascertained; this is not the case; the Committee of the House of Commons which sat last year, and which was so ably presided over by Mr. Ritchie, took complete evidence on this point, and the amount of the different bounties, as testified to before that Committee, has in no way been impugned. The effect of the bounties may be briefly described. They have naturally stimulated enormously the production of sugar in those countries where they are granted, since they have enabled producers who receive them to make large fortunes, whilst selling their produce below the cost of production. Producers of cane sugars, however, who have received no such artificial aid, have been forced to sell their sugar in competition with this State-aided product. In these circumstances, it is not surprising to find that whilst the beet crop, which has been so heavily subsidized, has increased during the last ten years by 100 per cent., the unsubsidized cane sugar production of the world, taken as a whole, has remained stationary during the same period. The magnitude of the interests involved will hardly perhaps be appreciated by those not conversant with the subject. There are some theorists who say, "Well, if sugar manufacture does not pay, employ your capital in something else;" unfortunately that cannot be done; vacuum pans will not spin cotton, and the capital invested in the sugar industry, if that industry ceases to be profitable, is practically lost, and I need hardly say that the capital invested in the British sugar industry is very large; probably in the West Indies, Natal, and Mauritius, it does not amount to less than £20,000,000. But the loss of this capital is not by any means all that is involved in the destruction of the British sugar industry. At present, Mauritius, Natal, and the West Indies produce about 350,000 tons of sugar, which involves an expenditure in British labour of not less than £7,000,000 sterling annually. (Cheers.) Again, we are now importing from Europe 300,000 tons of sugar annually, which, but for bounties, would probably in great part be produced in British colonies, and which represents a further sum of £6,000,000 spent

annually in foreign labour, a large proportion of which would be expended in British labour, if free trade in sugar were restored on British markets. Moreover, if this were done, it seems more than probable that sugar could be profitably grown in England, but whilst so serious an element of insecurity exists, he would be rash indeed who would embark capital for such a purpose. I think I may say that the evidence taken by the Committee of the House of Commons last year has conclusively proved the existence and the amount of the bounties. There has so far been no difference of opinion expressed as to the desirability of their removal. Liberal and Conservative Governments have vied with each other in their efforts to procure their removal, and the only question now which apparently exists is, as to the manner in which this shall be brought about. A loud cry has been raised as to the interests of the consumer, but if the removal of these bounties is an injury to the consumer, which I deny, then the object of eighteen years of negotiations, Conferences, and Conventions, has been the injury of the consumer, for it is self-evident that whether these bounties are removed by negotiation or by countervailing duties, the result to the consumer is identically the same. This is indeed so undeniable that it is surprising that it appears to have entirely escaped the observation of those who oppose countervailing duties; indeed, it is not too much to say that countervailing duties are a preferable means of obtaining the end desired, since if any sugar could come with a bounty, under a system of free trade, the bounty would be secured to the revenue. Now I saw it argued in an influential paper, not long ago, that if we put on duties, foreign Governments might increase their bounties, and so on *ad infinitum*. Well, in the first place, though foreign Governments are liberal in the way of bounties, there is a limit even to their liberality; but if it became a question of competition as to who should get soonest tired, we of receiving revenue from foreign Governments, or foreign Governments of paying it to us, I should myself feel no doubt of the issue. But it is evident that, if once the *raison d'être* of these bounties was removed, the bounties themselves would disappear. I said just now that the removal of these bounties, whether by

countervailing duty, or by negotiation, (for the effect would be the same) would be no injury to the consumer, and I say so for this reason. The result of these bounties is to make us dependent for our sugar supply upon an artificially created source. Hitherto we only rely for about one-third of our consumption upon this source, and yet a diminution in the yield of the beet crop of 1876-77 sent prices of sugar up 1d. per lb. It is evident that the more largely we are dependent upon this one source, the more liable we are to famine prices whenever the crop is deficient, particularly as the beet crop is all grown in a limited area, as compared with cane sugar, which is grown all over the tropical world. Then again, we have no security whatever that these bounties will be continued, and I cannot too strongly impress upon you the fact, that if bounties are ever acquiesced in by this country, no free competition is likely again to be renewed. No man will knowingly play against loaded dice; and the knowledge that bounties can be effectually used against him would be sufficient to prevent any sane man from embarking in what would result in inevitable loss. (Hear, hear.) But the evil does not stop there. The consumer will have no security that, once the bounties have achieved their object of stifling competition, foreign Governments may not strike out a new line, and put export duties instead of bounties on their sugar. *Timeo Danaos et dona ferentes* may well be said of these foreign Governments. There is only one other argument I wish to refer to, and that is this: it has been said, if Parliament recognise the rights of British subjects to free trade on British markets, they will be equally bound to recognise the rights of British subjects to free trade in foreign markets. This is indeed a strange theory; that, because we cannot obtain justice abroad, we must put up with injustice at home. So far as I am aware, there is no case analogous to that of sugar. (Hear, hear.) Should any such case arise, the same arguments as are applicable to sugar would of course equally apply, and it ought to be always borne in mind that export bounties may be given on other articles besides sugar, and that if the principle of allowing them to influence British markets be admitted, an element of insecurity is introduced of which it is

impossible to see the end. There are some who do not shrink from saying that we are asking for protection. What protection can there be when the whole world is placed on an equal footing? If we were asking for some special privilege for the West Indies, such a charge might possibly fairly be made; but what we ask for the West Indies, we ask equally for the whole world—for Cuba, Peru, Guadaloupe, Manilla, Java, and British India. What we ask, we ask in the interest of free trade. We ask that the competition of the whole world shall not be stifled by the European bounties—that English markets shall be freely open to the whole world, and not be monopolised by produce the outcome of a system at once unjust and injurious to all concerned. I will not believe that for the sake of temporarily obtaining one commodity below its cost price this country will tolerate or acquiesce in the infraction of principles upon which depend the security and vitality of our industries and the permanent interests of consumers. (Loud cheers.)

Mr. THOMAS M. KELLY (Assistant Secretary of the Workmen's National Executive Committee for the Abolition of the Foreign Sugar Bounties) said: My Lord Mayor, gentlemen, and fellow-workmen, the people of this country who have been appealed to at public meetings over and over again have either actively supported the movement for the abolition of foreign sugar bounties or tacitly acquiesced in our propositions. The *Times* and some other papers pretend to defend the interests of the working classes; in reality, however, they injure them, for in nine cases out of ten they do not understand the trade questions which are at issue. It is well, however, for the working classes of this empire that they have sufficient political sagacity and power to defend their own interests. This is not merely a Whitechapel question, as the paper emanating from Printing House Square sneeringly remarks; it does not alone affect one trade or one locality, but the whole nation. The great trade councils and associations of this country, we ought to remember, have memorialized the Government to put on a countervailing duty. And it is only reasonable to suppose that the secretaries and other officers of those associations understand the wishes of their constituents and have the interests of the people

they represent at heart. (Cheers.) If foreign bounties are permitted to ruin the sugar trade of this country and her colonies, what guarantee have we that the Governments abroad will not immediately bring the same tactics to bear, which have proved so successful for the destruction of one British industry, upon another of our manufactures. Whilst they are in vogue, there is no security for the cotton trade of Manchester or the woollen manufacture of Yorkshire. Some persons imagine that it is fine fun getting articles below their natural cost of production. If they only live long enough, and the foreign sugar bounties are not abolished, they will see that it is not such a good joke for the consumer after all, unless they can discern any amusement in paying monopolist prices. (Cheers.) That will not be all; for men willing and anxious to work will be walking about unable to gain employment, or will become chargeable upon the rates. The principle of free trade has been attacked by foreign nations, and it is high time that our own Government did something to defeat this insidious foreign aggression. We invite competition—we are not afraid of it—from all parts of the world, knowing that our skill and industry, if only permitted fair play, will prove more than a match for any competition which we are likely to experience. (Loud cheers.)

The resolution was adopted *nem. con.*

Mr. ALFRED HENRIQUES moved the fourth resolution, which runs as follows:—"That the Right Hon. the Lord Mayor be requested to sign a copy of the foregoing resolutions, and forward the same to the First Lord of the Treasury."

Mr. GEORGE MARTINEAU (Secretary of the British Sugar Refiners' Association), who, upon rising to second the resolution, was received with considerable cheering, said: I cannot help thinking that the question which has brought us here to day has been thoroughly exhausted. (Hear.) I shall not trouble you, upon this occasion, therefore, with any lengthened remarks of my own. Little more could be said on the occasion than has been urged by previous speakers, especially by the hon. member for Southwark and the gentleman who immediately preceded him. (Hear, hear.) I

will only add one fact. The honourable member for Southwark has said that both the Liberal and Conservative Governments of this country have tried to get rid of these bounties. To that I wish to make an addition. When Mr. Gladstone introduced to the House of Commons the Convention of 1864, he said that that Convention was entered into with the view of establishing "perfect freedom of trade," and he added that Her Majesty's Government regarded the arrangement as beneficial alike to the producer and the consumer. Those were Mr. Gladstone's words, and they entirely get rid of the difficulty with regard to the consumer. I beg to second the adoption of this resolution. (Cheers.)

Mr. D. MACIVER, M.P., spoke in support of the resolution.

Mr. LIGGINS, who described himself as a West India planter, said: I want to state a phase of this question which has not been touched upon by any previous speaker. I am not going to say anything about protection or free trade. If we receive sugar from our magnificent colonies in the West Indies, we must remember that it is brought to this country in English ships, manned by English sailors,—men who will stand by us in our hour of need, and be ready and willing to defend the honour and interests of this our country. Navigating vessels from the West Indies is a fine training for sailors, but woe to the day when England has to depend on men whose only training has been coming across the channel from Boulogne in a steamer. (Hear, and laughter.) That is a question for us all to answer. The West India sugar trade is doing all it can to develope itself, but it is impossible for it to compete in English markets with foreign bounty-fed beetroot sugar.

The resolution was then put to the meeting and adopted.

Mr. DAVID POWELL, Junr., (Chairman of the East and West India Dock Company,) moved a resolution thanking the Lord Mayor for his great kindness in granting the use of the Egyptian Hall to hold the meeting in, and also for the interest he manifested in the proceedings by taking the chair. The speaker, who was cordially received, said: This meeting has been a great and wonderful success. It is a purely representative meeting, as all

classes and different industries are represented, and, so far as I am able to judge from the various sounds which came from the different parts of the Hall, I should say that all political parties have had their interests represented here to-day. (Hear, hear.) I think it should go forth that it is the general feeling of the whole of the city of London that a countervailing duty should be put on, and that the Government should lose no time in doing so. (Loud cheers.) If this meeting had been held in a corner, or thinly attended, I do not think we should have effected much. As it is, however, I am of opinion that we have done a great deal towards removing the evils we all complain of. (Cheers.) The Lord Mayor, with his proverbial kindness, has given you the use of this Hall. (Cheers.) A Hall in which many of the most important questions have been ventilated;—(Hear, hear.)—and he has also done us the honour of presiding over our deliberations. I, therefore, beg to tender him on behalf of this meeting our best thanks. (Loud and prolonged cheers.)

Sir T. EDWARDS-Moss, Bart., Deputy-Chairman of the West India Association of Liverpool, seconded the resolution.

The motion was then adopted amidst loud applause, which was repeated on the Lord Mayor rising to acknowledge the compliment.

ARTIFICIALLY COLOURED SUGAR.

A subscriber in Demerara requests us to give publicity to the following letter, which appeared in the *Daily News* of 22nd April:—

Sir,—Your leading article of yesterday in reference to the colouring of Demerara sugar for the American market is correct, but it requires the following explanation to make the subject fully understood. The duty on raw sugar is assessed in the United States according to its colour. On raw sugar ranging in colour between Nos. 7 and 10 of the Dutch colour standards it is $2\frac{1}{2}$ dollars per 100 lbs., which is 78 per cent. of the drawback allowed on the exportation of pure refined sugar. If, therefore, such raw sugar yields 78 per cent. of refined

sugar, the refiner receives in drawback the exact sum he has previously paid in duty on the raw material. But if it yields more than 78 per cent. he receives more than he has paid, and obtains a bounty on the exportation of his refined sugar. His object, therefore, is to get raw sugar of the maximum richness and the brownest colour. He is the more impelled to this from having to compete, in all export markets, against French and Dutch sugar, which obtains a similar bounty. He finds such sugar most readily in Cuba and Demerara, where very strong crystallised raw sugar is produced in large quantities. This sugar is naturally of a fine pale yellow colour, but it is made of a dark brown tint, specially for the American market, as described in your leading article. Whether the addition of molasses, and the omission to neutralize the lime and remove the impurities be rightly or wrongly called "artificial coloration," the fact remains that the sugar is made of an unnaturally brown colour, for the purpose of supplying a special demand, the object of which is to obtain a bounty on the exportation of refined sugar at the expense of the United States Treasury. This coloured sugar yields about 90 to 92 per cent. of pure refined sugar, and therefore gives the American refiner a very large export bounty.—I am, Sir, yours, &c., GEORGE MARTINEAU. 21, Mincing Lane, April 20.

THE PRACTICAL DETERMINATION OF THE VALUE OF THE SUGARS OF COMMERCE.

By HENRY A. MOTT, Jun., Ph.D., E.M.

This is a problem to which great attention has been given by planters, importers, refiners, and government officials. Its consideration by scientific men, then, seems most important. It is the object of this paper to present the views of the author, which have been acquired after carefully studying the subject under consideration. Owing to the many constituents which enter into the composition of sugar in the "crude" or "raw" condition, and to the fluctuations in the proportions of these constituents, also the

variance in the colour of the sugar, and, *above all*, the difficulty in obtaining an average sample that will represent a cargo, it becomes almost next to an impossibility to arrive at anything more than an approximate estimate of the value of a cargo of sugar, on a small scale, necessary for laboratory investigations. Still, many very valuable indications as to the value of a cargo of sugar may be obtained in the laboratory, which, when combined with other indications, such as the brand, the colour, the depth of foots, etc., will enable one to arrive at an approximate estimate as to its real value. To assert that it is possible to obtain anything more than an approximate value would be simply to assert that which could not be demonstrated. From these remarks, however, a chemist must not be led to suppose that great care and accuracy has not necessarily to be adopted in their examinations. On the contrary, the greatest possible care is necessary; and it should be the object of every chemist to perfect the process he adopts for the examination of sugars, so that every possible error will be eliminated. By doing this it will be possible, then, to arrive at a truer basis for estimating the value. The constituents which enter into the composition of raw sugars are as follows:—

Cane sugar.	
Inverted sugar,	{ Dextro-glucose, Lævulose.
Water.	
Gum.	
Coloring matter.	Aconitic, acetic, and oxalic acid.
Organic matter,	{ Other organic substances. Albuminoids, etc., not determined.
Inorganic matter,	{ Salts nominally present. Sand, etc., abnormally present.*

Although it is impossible as yet to determine the percentage of all these constituents, still chemical analysis admits of the determination of the more important elements, and the following table contains the results of several analyses which I have from time to time had occasion to make:—

Constituents.	Granulated Sugar.	Refined Soft B.	Refined Soft D.	Raw Centrif.	Raw Centrif.
Cane sugar*	99.8*	91.1	80.7	98.9	89.1
Inverted sugar	—	3.39	9.21	—	1.21
Water	0.2	3.23	4.72	.65	4.25
Organic matter† ..	—	1.89	4.45	} 0.45	4.62
Inorganic matter‡ ..	—	0.39	0.92		0.82
	100.00	100.00	100.00	100.00	100.00

Constituents.	Raw Molasses.	Raw Molasses.	Raw Muscovado.	Raw Muscovado.	Raw Melado.
Cane sugar*	80.0	91.2	80.5	93.2	78.1
Inverted sugar	3.65	4.1	5.30	3.20	9.30
Water	6.71	2.2	5.60	1.20	9.00
Organic matter† ..	6.04	1.49	6.19	1.33	1.29
Inorganic matter‡ ..	3.60	1.01	1.41	1.07	2.31
	100.00	100.00	100.00	100.00	100.00

The elements necessary to be known before any approximate value can be put on a given cargo are :—

1st. The number of hogsheads from which the sample has been taken.

The obtaining of an average sample has to be done with great care, and considerable discretion must be exercised by the sampler, as very often a large number of hogsheads are found mixed in with a given lot of sugar which are quite inferior in grade. In such cases it is always well to make a separate sample of the same and count the number of hogsheads found. Experienced samplers consider that a handful of sugar taken, by means of an auger, from 20 to 50 per cent. of the number of hogsheads in a given lot, thoroughly mixed together, is a fair average of the lot. In all hogsheads, except centrifugal, the hogsheads are bored in the centre,

* Corrected test by inversion in all cases.

† Gum, colouring matter, aconitic, acetic, and oxalic acid; albuminoids, etc., not determined.

‡ Salts normal; mineral substances abnormal.

and then at the foot. In centrifugal, besides being bored at the foot, the hogsheads are bored about 4 inches from the top to save loss of sugar. The samples weigh about 16lb. At best it can only be hoped to obtain, in the ordinary run of sugars, an approximate to the true average; and it is for this reason that great care should be exercised in the consideration of the other factors, so that no more errors can creep in.

2nd. The brand of sugar, whether it be a centrifugal Muscovado, molasses, clayed Manila, Pernambuco, Melado, domestic molasses, etc., etc.

3rd. The colour, according to the Dutch standard. This is, of course, a very important element to know, as the cost of decolorizing a dark coloured sugar is not to be ignored.

4th. The presence or absence of excess of gum. This can be determined by feeling the sugar. An excess of gum hinders the rapid filtration of sugar, and also increases the expense of decolorizing.

5th. The depth of foots in the hogsheads. Overlooking and not allowing for this element may be the cause of great loss. In Trinidad sugars, when "green" (or new), the foots vary from 5 to 12 inches, but generally from 6 to 8 inches. When the sugar gets old, the foots vary from 5 to 7 inches. In Martinique sugar, when green, the foots vary from 4 to 8 inches; when old, from 5 to 6 inches. The hogsheads are smaller for Martinique sugars than for Trinidads, the former holding only 1,200 to 1,300 lb., while the latter hold from 2,000 to 2,500 lb. In molasses sugars the foot amounts to from 3 to 5 inches in the green sugar, and from 0 to 3 inches in the old.

In Cuba-Muscovado sugar there are from 5 to 6 inches of foots in the green, and 2 to 4 inches in the old sugar. In centrifugal sugar, in the green, from 1 to 2 inches of foots are found, and in the old from 0 to 2 inches. The foot of a sugar will test all the way from 2 to 10 per cent. less than the sugar itself.

6th. The general condition of cargo. This is all important, for often the cargo is so badly damaged by water that it becomes next

to an impossibility to obtain an average sample, or, in fact, a sample which will in any way truthfully represent the same.

7th. The per cent. of cane sugar present.

8th. The per cent. of impurities.

9th. The per cent. of dry substance ; and—

10th. The per cent. of sugar in the dry substance.

Many of these factors can be obtained outside of the laboratory, such as regards the sample, the brand, the color, the gum, the depth of foots, and conditions of cargo. Of the other five factors, only two have actually to be determined in the laboratory, which are :—

1st. The percentage of cane sugar present.

2nd. The per cent. of water from these two. The other three can be easily obtained by calculation. It, therefore, becomes a matter of very great importance that the processes for determining the percentage of sugar and water should be as accurate as possible. Many processes for the determination of sugar other than by the use of the saccharometer have been suggested from time to time; and although some of them are quite short, and give quite accurate results, especially the process proposed by P. Casamajor with methylic alcohol, still I think it is generally conceded that while such processes are of value when saccharometers cannot be readily obtained, they are not to be preferred when the saccharometer is at hand. Of the various instruments on the market, it becomes an important problem to determine the one most suitable for the examination of sugar. To make the selection properly, it becomes necessary to know the distinguishing features of each instrument. One point can be decided, though, at the start, that the instruments which require only 16·35 grammes to be dissolved and decolorized in 100 c.c. are much to be preferred for dark-colored sugars than the instruments which require 26·048 grammes of sugar; for the simple reason that it is far easier to decolorize 16·35 grammes than 26·048 grammes in the same number of cubic centimeters.

The answer to this is, that instead of 26·048 grammes of sugar, half the quantity can be weighed out, and the result can be multiplied by two. This is, however, very objectionable, as it opens room for

errors; and any deviation in the reading of the instrument from the correct, when multiplied by two, makes a very serious error.

To those who have had the facility to work with both instruments, and have had to work on dark-colored sugars—especially those known as domestic molasses—cannot help but arrive at the conclusion, that while 26·048 grammes of a light-colored sugar in 100 c.c. is not too much, that quantity of a dark-coloured sugar is entirely too much; and further, no suitable solution for examination can be prepared without using half weight, and then multiplying the result by two.

It is for this reason I prefer the instruments which use only 16·85 grammes of sugar where general work is to be done, including all grades of sugar and molasses; but where light-colored raw sugars and refined sugars are examined, the other instruments are equally as good.

We find on the market a variety of instruments: Biot's polarimeter, Mitscherlich polarimeter, Duboscq polarimeter, Duboscq soleil saccharometer, Ventske soleil polariscope, Ventske-Scheibler polariscope, Jellet's saccharometer, Wild's polaristrobometer, and Laurent's penombre. Biot's instrument was constructed by him for the examination of liquids possessing the power to rotate polarized light. It was the first instrument of the kind constructed, and therefore subject to improvement. Mitscherlich constructed an instrument for determining the amount of cane sugar there was in raw sugars, as also in the sugar beet. His instrument, therefore, was used in German beet-sugar works. Mitscherlich found by carefully conducted experiments that in his instrument an aqueous solution of sugar containing 30 grammes in 100 c.c., when examined in a 200 mm. tube, rotates polarized light 40 angular degrees if the appearance of the "tiente de passage" is looked to; hence, each degree on the disc indicates 0·75 gramme of crystallizable sugar.

Duboscq found that when he dissolved 16·85 grammes of pure sugar in water and diluted it to 100 c.c., and then examined the solution in a 200 mm. tube, it gave the same rotation as a quartz plate 1 mm. in thickness. He divided the distance corresponding

to such displacement of the wedges in 100 divisions, so that each division equals 0·1635 grammes cane sugar.

Ventske, on the contrary, used for his original researches a sugar solution of 1·1 specific gravity (corresponding to 26·048 grammes sugar in 100 c.c.), and marked the deviation 100, and arranged his scale so that each division indicates 0·26048 gramme of crystallizable sugar in 100 c.c.

Wild's polaristrometer, the original Duboscq and Laurent's penombre, all use the monochromatic light. In Wild's instrument there are two scales, one for cane sugar determinations only, and indicating, if a 200 mm. long column be inserted for each division, 1 gramme of sugar in one liter in solution; while the other represents the angular degrees for the examination of beer.

The Laurent penombre has combined the simplicity of construction of Biot and Mitscherlich instruments, and is a great improvement on them. It has a crystal of bichromate of potash, which only allows the yellow light to pass through. The disk bears a scale for 16·2 grammes of sugar in 100 c.c., as also a scale for angular degrees. If empty and adjusted, the field of observation appears with a yellow tint, the half of which darkens when a polarizing liquid is inserted; but as one-half of the field remains intact, the original tint can be restored in the second half. It is claimed by some observers—Steiner,* for example—that there are two advantages for an observer working with a yellow flame; first, that the disappearance of black can be more easily watched than any change of colour; and, secondly, that the defect of Daltonism is of no consequence whatever. These two claims I consider entirely without foundation. I will admit that the disappearance of black is readily noticed, but that is not all; it is necessary to get the two sides of the field exactly the same yellow tint—which is quite difficult with dark yellow as compared with a light rose tint, or even a very light yellow.

I have worked on this instrument considerably, and am fully satisfied it is not sufficiently delicate to enable one to read one or two tenths. The best instrument, in my opinion, is the Duboscq

* *Scientific American Supplement*, No. 201.

soleil, which only requires 16·35 grammes of sugar, and is all arranged with the necessary tubes for testing by inversion—a point ignored by the Germans—and has a sufficiently long scale on the right of the instrument for such purposes.

Some of the causes of error in the laboratory, and to which particular attention seould be given, are :

1st. The graduation of the flasks used. The idea that any 100 c.c. flesk is applicable for operation is a serious mistake, and often the cause of errors amounting to two or three per cent. What is wanted is a flask graduated so that it will hold 100 grammes of water. This is very easily accomplished now, owing to the investigations of P. Casamajor—which are fully described in a back number of the "Journal of the Amer. Chem. Soc."

(*To be continued.*)

THE DEMERARA DARK SUGAR QUESTION.

The following Reports on this intricate question, which we submit without any remarks of our own, may be of interest to those of our readers who are more immediately concerned in its final and intelligible settlement :—

REPORT OF THE COMMISSION APPOINTED BY THE GOVERNOR OF
BRITISH GUIANA UPON THE ALLEGED ARTIFICIAL COLOURING OF
SUGAR IN THAT COLONY.

[Copy.]

Colonial Office.

To His Excellency WILLIAM ALEXANDER GEORGE YOUNG, Esquire,
Companion of the Most Distinguished Order of Saint Michael and
Saint George, Lieutenant-Governor and Commander-in-Chief in
and over the Colony of British Guiana, Vice-Admiral and Ordinary
of the same, &c., &c., &c.

The Commissioners, the undermentioned, the Honourable Charles
Piercy Austin, and the Honourable James Crosby, members of the

Honourable the Court of Policy, and Nicholas Cox, Esquire, now respectively lawfully exercising the offices of Government secretary, immigration agent general and inspector of police in the colony of British Guiana, appointed on the 4th June, 1879, by your Excellency, pursuant to the instructions of Her Majesty's principal Secretary of State for the Colonies, to make a thorough investigation and inquiry, and to ascertain the manner of manufacture of certain sugars of a dark colour, commonly known as dark vacuum pan sugars or as dark centrifugal (crystals) heretofore exported from this colony to the United States of America, and of some of which seizure has been made by the officers of the Government of the United States of America, upon the allegation that the said sugars were artificially coloured, have now respectfully to submit their report to your Excellency.

1. In obedience to the instructions conveyed to them in the commission, the commissioners after certain preliminary meetings, and after public notice of their intention, formally opened the commission on the 26th day of June, 1879. The commissioners had, as your Excellency intended, in the first instance, acting upon the terms of the commission, to have inquired into the manufacture of the sugars seized in 1877, and from the evidence of those engaged in the transmission of such sugars, to have endeavoured to elicit the truth as to such sugars being artificially coloured or otherwise. Papers subsequently placed in the hands of the commissioners for perusal, showed this course would be useless, and they resolved, with your Excellency's sanction, to confine their inquiry solely to the manufacture of sugar made under their own observation on some of the estates in this colony, and to obtain evidence on oath from those concerned in the manufacture of such sugar made in their presence, touching the manner of manufacture of such sugar; but a reference to the evidence will show that the commissioners while examining witnesses employed in manufacturing sugar in their presence, and finding that some of those persons had also assisted in the manufacture of similar sugars made in this colony, and seized by the American Government in 1877, took advantage of the opportunity

thus afforded them, also to examine these persons as to the part they took in the manufacture of those sugars so seized.

2. In pursuance of the resolution above mentioned, letters were addressed to the representatives of two estates, one plantation "Enmore," situated on the east coast of the county of Demerara, and the other plantation "La Grange," on the west bank of the Demerara river, to ask if they would be willing to manufacture sugar, commonly known as dark crystal sugar, in the presence of the commissioners. From the representatives of both estates replies were received expressive of their readiness to manufacture such sugar.

3. After some delay, consequent on the time of year, when sugar manufacture ceases for a short period, the commissioners were enabled to proceed with the inquiry on the 19th August, when they paid a visit to plantation Enmore, where the manufacture of sugar was then to be recommenced.

4. On Monday, the 18th August, the commissioners, attended by the secretary and the Government analytical chemist, proceeded up the east coast of Demerara, to be prepared to visit the Enmore estate at five o'clock a.m., on the morning of the 19th August, in order that they might be present from the commencement of the first stage in the manufacture of the sugar, and they were so present at the hour named. After a thorough examination of the various receivers and all open receptacles used in the different stages of the manufacture, the manager of the Enmore estate, at 20 minutes past six, commenced grinding with the canes, as brought in by punts from the fields.

The commissioners narrowly watched the manufacture of the sugar, from juice into liquor, liquor into syrup, and syrup into sugar, through its every phase. Samples were taken at each stage of the manufacture, and are now submitted with this report. The manufacture of the dark crystal sugar on the Enmore estate was first proceeded with, and occupied the greater part of the 19th and 20th of August, after which, clear sugar, of the kind usually made on the estate was manufactured. The commissioners occupied the latter part of the time on this visit in taking some of the evidence which is forwarded with this report. The commissioners during this visit,

remained in the buildings from shortly after five a.m., on the 19th August to about five p.m., on the 21st August, taking all their meals in the buildings, and such rest as each in turn was enabled to obtain. During the manufacture of the dark crystal sugar the whole process was narrowly watched by the commissioners throughout.

5. On the La Grange estate, on the 8th and 9th of September, the same careful examination of the vessels was made, and watchfulness was observed during the process of manufacture of the dark crystal sugar as on the Enmore estate. The commissioners arrived on the estate on the first named day at seven a.m., and shortly afterwards the works were set in motion; during the night of 8th September, one or other of the commissioners was on watch throughout the night. The commissioners remained in the buildings on the La Grange estate from seven a.m., on the 8th September, to about five p.m., on the 9th September. On the 10th September a visit was paid again to the La Grange estate, and some samples taken in addition to those taken on the two previous days.

6. The process of making dark crystals on the two estates was somewhat different in its detail. On the Enmore estate less lime was used, $5\frac{1}{2}$ to $6\frac{1}{2}$ lbs. being weighed out for each clarifier containing 800 gallons of liquor; the liquor and syrup were likewise skimmed of some of the impurities, and molasses were added to the vacuum pan after the first strike, and after the crystals had formed in the pan; on the La Grange estate about 10lbs. of lime was added to each clarifier of 600 gallons of liquor, there was no skimming at any stage of the manufacture, and no molasses was added.

7. The evidence which was taken by the commissioners, and which is submitted with this report, comprehends the examination of the principal persons employed in each separate stage of the manufacture, from the time when the canes were brought to the mill to the last stage, when the sugar was conveyed to the sugar room to be packed, and includes the evidence given by the Government analytical chemist, and of the opinion formed by that gentleman from his scientific knowledge, and from his own observation, whilst witnessing the manufacture of the dark crystal sugar on both estates, and of

the clear sugar on the Enmore estate, and whilst present at the examination of those directly connected in the manufacture of the sugar.

8. The samples of two complete series taken during the manufacture of the sugars on the Enmore and La Grange estates, sealed with the seal of the Government Secretary's office, an impression of which is hitherto annexed, have been carefully packed in cases, marked respectively Nos. 1, 2, 3, and 4, directed to the Right Honourable, Her Majesty's Principal Secretary of State for the Colonies, Downing Street, London.

The contents of these cases are more particularly described and set forth in the certificate forwarded with this report, dated the 2nd October, 1879, furnished by Thomas Fitzgerald, Esquire, Secretary to this commission.

9. The opinion unanimously arrived at by the commissioners is that the colour of the crystals in the dark sugar, appears to be mainly attributable to the additional temper lime used in the manufacture of dark crystal sugar, although the impurities left in the juice, and the addition of molasses on the Enmore estate, and the impurities left in the juice on the La Grange estate, aided to this like result. The additional temper lime added in the manufacture of dark crystal sugar appears to the commissioners to result in the obtaining of a larger quantity of saccharine matter from the juice, and to produce sugar of great purity.

10. In conclusion the commissioners have to express the conviction that they have found that sugars of the kind commonly called dark vacuum pan sugars or dark crystals, can be, and have been manufactured in their presence, in British Guiana, without being artificially coloured; the use of temper lime in the manufacture of sugar made from cane juice being at all times a necessity.

All of which is respectfully submitted to the consideration of your Excellency.

(Signed)

CHAS. PIERCY AUSTIN,
JAMES CROSBY,
NICHOLAS COX.

Georgetown, Demerara,
3rd October, 1879.

LIEUTENANT-GOVERNOR YOUNG TO SIR M. HICKS-BEACH.

[Copy.]

Government House,

British Guiana, No. 222.

Georgetown, Demerara,

6th October, 1879.

SIR,—Referring to Governor Kortright's despatch, No. 3 of the 3rd January, 1879, and to your despatches, No. 57 of the 15th April, No. 71 of 1st May, No. 88 of 29th May, and No. 140 of the 11th August, I have now the honour to forward herewith the report made by the commission appointed under the instructions contained in your despatch first mentioned to investigate the manufacture of sugar alleged to be artificially coloured, together with the minutes of the evidence taken, and certain documents necessary to verify the samples which were from time to time obtained. These samples have all been securely sealed, and two sets carefully packed will be forwarded to London by the outgoing mail steamer.

2. From the intelligence which has reached us of the action recently taken by the United States Government in respect of the admission of sugars, I fear that the labours of the commissioners will prove but of little avail towards securing a market in the United States for dark crystal sugar, but I think that the result of the investigation cannot be taken otherwise, than as a complete refutation of the allegations, that sugars of that class manufactured in British Guiana are artificially coloured.

3. It would appear that there are two processes by which sugar known as dark crystals can be produced, but that the dark colour is mainly due to the lime used in the manufacture not being neutralised by the use of bleaching agents. Lime is an agent which enters into the manufacture of all classes of sugar, and without which it is asserted no sugar can be made from cane juice. The ordinary sugar of commerce, known as Demerara crystals or vacuum pan sugar, can, it appears, only be produced by the use of bleaching agents and a complicated process of manufacture, which does not obtain in the production of sugar known as dark crystals.

4. The evidence which is submitted, is connected and satisfac-

tory, and should, I think, be deemed conclusive. It is given on oath administered under the powers vested in the commission, but it will be seen, that the commissioners themselves by their personal presence and continuous observation throughout the process of manufacture qualified themselves to form an opinion independent of the evidence given before them.

One of the Commissioners, Mr. Cox, the inspector-general of police, had previously to his entering the public service, been employed on a sugar estate for four years, from 1847 to 1851, first as an overseer, and subsequently as deputy manager. He consequently possessed practical knowledge of the process of sugar making and would quickly have detected any attempt at deception. It was mainly on account of his being thus specially qualified, that I selected Mr. Cox to serve on the commission, although his qualifications otherwise were of no mean order.

5. The samples were all taken in triplicate. Two sets are put up to send home, as the commissioners considered that probably it would be deemed expedient to forward one set to Washington, and to retain the other in London. The third set of samples will be retained intact in British Guiana.—I have, &c.,

(Signed) Wm. A. G. YOUNG,
Lieut. Governor.

The Rt. Honble. Sir M. Hicks-Beach, Bt., &c., &c., &c.

DECISION OF THE UNITED STATES COURTS AS TO THE MEANING OF
THE TERM DUTCH STANDARD IN COLOUR.

In a circular "Relative to rates of duty to be exacted on imported sugar" issued by the Treasury Department, signed by Mr. Assistant Secretary French under date of September 2nd, 1879, addressed to collectors and other officers of customs, the following paragraph is found.

"It has been decided by the courts that the term 'Dutch standard in colour' as used in the statutes, means the colour of the sugar obtained by the ordinary process of manufacture, as practised at the

time of the enactment of the law adopting such standard, and that any means used to degrade the colour of the sugar during or after the process of manufacture, is a fraud upon the revenue." The same statement, in substance, was made recently by Mr. French before the House Committee of Ways and Means, and in speaking of the decisions of the Courts he said that he meant the decisions in the California case, and the case of the U.S. *v.* Perot, claimant, which was tried in the U.S. District Court for Maryland, in the autumn of the year 1878. These are, in fact, the only two reported cases in which the point came up, which is referred to in the extract from the Treasury circular above given.

The California case (U.S. *v.* cargo of sugar, 3 Sawyer's Reports, 46,) was to some extent the basis of the decision in Baltimore, and the only case referred to on the point in question, which constituted the main legal issue. Neither case furnishes the slightest ground for the statement of the law, which Mr. French has made. In neither case was it held or intimated that the term "Dutch standard in colour," as used in the statute, means "the colour of the sugar obtained by the ordinary processes of manufacture as practised at the time of the enactment of the law" or that "any means used to degrade the colour of the sugar during the process of manufacture is a fraud on the revenue."

The case in 3 Sawyer, 46, was one in which there was no question at all as to process of manufacture, whether new or old, usual or unusual, ordinary or extraordinary.

The charge, as appears by the opinion of the court, was that the merchant, importer, consignee, or agent had coated the sugar with charcoal, &c., and so darkened its colour after the sugar maker had delivered it into his hands as a manufactured article. The case discloses no imputation whatever upon the manufacturer, and Judge Hoffman, on pages 54-5, draws the plainest possible distinction between colouration after manufacture, which he pronounces criminal, and colouration in the process of manufacture, which he declares to be unexceptionable. The precise language of the Court (p. 55,) is as follows: "Undoubtedly while the sugar, or while the cane juice rather, remain in the manufacturer's hands, he may omit to take out

the impurities, or may put in impurities if he so desires, for as yet it has not become sugar. . The hue of the sugar—that is the result of the operation—will be determined by the degree to which he has abstracted the impurities or foreign substances from it, or the amount of such foreign substances as he may have introduced into it. But when it has passed out of his hands and gone into the hands of the importer or the merchant, then the hue it has acquired is the ‘colour’ that Congress had reference to when it established colour as a standard of classification.” In the Baltimore case, the whole defence on the question of colouration rested upon the doctrine first quoted, and it was instituted by the defence that the seized sugars had not been coloured after manufacture, but had been made of a dark colour, in the course of manufacture, by a novel and newly discovered process, which left in the juice a portion of the impurities ordinarily removed by clarification. It was admitted and avowed by the claimant that this process was resorted to for the express purpose of making dark sugars for the American market. If the law had been as laid down by Mr. French, the claimant would have been put out of court by the mere statement of the defence. His admission that the process was not one of “the ordinary processes of manufacture, as practised at the time of the enactment of the law adopting the Dutch standard,” but an entirely novel and different process, would, on Mr. French’s theory, have been a plea of guilty and not a defence. The avowal that the colour had been “degraded during the process of manufacture,” by such new process, would have been equally conclusive against him, and yet the whole force and proof of the Government were spent at the trial in proving that the sugar was manufactured by the “ordinary processes,” and not by a new process, and that its colour was not given in the manufacture, but put on after crystallization. However, it is not worth while to make any collateral suggestions, for what Judge Giles said, in finally deciding the law of the case, will explain itself, and put the question at rest.

On November 16th, 1878, after the evidence was closed the District Attorney presented the following prayer :

“If the jury believe from the evidence that the sugars seized and

informed against in this case were made in the manner testified to by the witnesses for the defence, who conducted their manufacture ; and if the jury shall further find from the evidence that such process of manufacture was adopted and carried out with the object of producing a sugar of the value and amount of actual cane sugar, shown by the evidence to be the case with said sugars, and at the same time of so conducting the manufacture as to carry on with the manufacture of the sugar from the juice a process of colouring, so as to give to the sugar a colour similar to that of a low grade of sugar, and with the object of giving a colour so as to be below No. 10 Dutch standard ; and that such colouring process was conducted, not for a *bond fide* purpose of manufacture, but adopted at the suggestion of the importers, to enable the same to be imported into the United States at the rate of duty imposed on sugar below No. 10 Dutch standard ; and that the same was imported by the claimants, with the knowledge of such colouring process and the object thereof and with the intent thereby to have said sugar passed at such a grade of colour thus produced, then the verdict of the jury should be for the plaintiff.”

Judge Giles instantly rejected the prayer in these words :

“ I will reject this prayer upon two grounds.

“ First. I reject it because it is not embraced within this information. This information is entirely an information for colouring sugar of a brown colour, after its crystallization.

“ Second. I reject it because I repudiate the principle of law asserted in it. I am against the whole theory. I hold that a foreign manufacturer has a right to make a sugar of what colour he pleases.”

The counsel for the claimant then submitted the following prayer.

“ If the jury shall believe, from the evidence, that the sugars seized in this case were manufactured by the process and in the manner described and sworn to in the depositions of Messrs. Agard and Daly, and explained and illustrated in the oral testimony of Messrs. Gray and Gilzean, the claimants are entitled to a verdict upon all the issues submitted to the jury.”

This prayer the Court granted, in conjunction with the two following instructions of its own, viz. :

" I shall instruct the jury as follows :

" There are two issues that the jury are required to pass upon in this case. First. Were these sugars artificially coloured a dark brown colour by some foreign matter applied to them after their crystallization for the purpose of their being introduced into the United States at a lower rate of duty than they otherwise would be required to pay ?

" Second. Did the claimants know this fact, and did they introduce them into this port with the fraudulent intent of importing them at a lower rate of duty than they should otherwise have paid ?

" If they find that the sugars were not artificially coloured after their crystallization, but were coloured in the process of manufacture, then there can be no conviction."

All the language above quoted is taken from the phonographic report of the proceedings on November 16th, 1878, of which a duplicate is in the hands of the Government.

It is plain from the foregoing that the Courts have not decided or intimated what he has ascribed to them, but that they have decided precisely the contrary.

EXTRACT FROM PROCEEDINGS AT A MEETING OF THE COURT OF
POLICY OF DEMERARA, HELD MAY 14TH, 1880.

The following letter from A. W. Perot & Co., was read :—

Georgetown, 10th May, 1880.

Sir,—Referring to the publication in the *Official Gazette* of date 8th May, containing the views of the United States' Treasury Department on the report of the Commissioners appointed by the Government to inquire into the manufacture of so-called dark sugar in this colony.

We have the honour to forward to you, under cover, for the information of His Excellency the Governor and the Honourable the Court of Policy, with the view of having it brought to the notice of the proper authorities who are in negotiation with the United States Government on the subject, a copy of a memorandum forming the basis of a purchase of vacuum pan refining sugars in the month of

November last, and our former and subsequent purchases were based on a similar understanding, either verbally or in writing, from which it would appear that in purchasing vacuum pan refining sugars for the United States market (the manufacture of which has caused so many, and is still the subject of inquiries) both molasses and chemicals are specially objected to.

We do not in any way allude to the use of lime, as without that article no granulated sugar can be manufactured.

We have the honour to be, Sir,

Your obedient Servants,

A. W. PEROT & Co.

To the Honourable the Government Secretary.

Copy of a Memorandum furnished to parties contracting to deliver vacuum pan refining centrifugal sugars:—

To Messrs. A. W. Perot & Co.

"We hereby offer you — for one hundred hogsheads vacuum pan refining centrifugal sugar, — dollars and — cents per hundred pounds Dutch weight.

"The sugar to be pure. No chemicals nor molasses to be used in its manufacture. To be of a dry, bold grain, and to rate betwixt seven and ten Dutch standard. We say nothing of polarizations, as if the sugar is faithfully made it should show 95 per cent."

The LIEUTENANT GOVERNOR AND GOVERNMENT SECRETARY said it could be seen at once from that order that it was really an honest article that was sent to the United States.

Mr. DRYSDALE said he did not see that the use of molasses in the pan had anything to do with the colour of the sugar manufactured. He had himself made the purest and whitest sugar by placing molasses in the pan, and it was always used in the manufacture of all kinds of sugar, without reference to any particular colour. It was quite a mistake to suppose that molasses was used in the pan for the purpose of colouring. It was used for the purpose, more particularly, of using up the article, instead of converting it into rum. Why that should be made a subterfuge for asserting that it was used for the purpose of colouring, he did not know.

Mr. RUSSELL agreed with what had been said by Mr. Drysdale.

It would be very wrong for the planters to restrict themselves to any particular means of obtaining the largest amount of crystallizable matter out of the cane-juice. He could only say that in this present season he had turned out sugar of a very high polarization, where he had turned out nothing except sugar, and had converted the whole of the cane juice into sugar—a thing that had not been done in Demerara before—and that sugar was a fit article for the refineries of any country in the world. To get rid of the chemicals used, they resorted to taking back the molasses into the pan, and that imparted a bloom or yellowness into the sugar. And strange as it might appear, the white sugar that the refiners at home could turn out did not sell for more than within three shillings per cwt. of the yellow sugar made from the cane juice in Demerara with the molasses in it. The whole difficulty lay in assessing the rate of taxation upon a colour test.

The GOVERNMENT SECRETARY AND LIEUTENANT GOVERNOR said that in the despatches laid before them the other day it was argued that if a duty was placed upon a black horse, and a man whitewashed his horse in order to evade that duty, it would be a fraudulent act. Well, he did not suppose any one in his senses would dispute that proposition; but the illustration that occurred to him was this. He remembered some years ago in England a tax was collected upon four-wheel vehicles, the wheels of which were above 18 inches; vehicles the wheels of which were less than 18 inches were exempt. What was the result? That all the wheels of the pony chaises were made 17½ inches—consequently, they were exempt from taxation. Now, he did not think any one would say that there was any fraud upon the revenue in that case. Fancy one of the vehicles being seized by a revenue officer, and a charge being brought that it really was a vehicle with wheels of 18 inches, because the wheels had been made 17½ inches for the purpose of escaping the tax! It appeared to him that that was precisely the case with regard to this sugar. Here they had an honest sugar—a pure sugar, and it was said that it was a sugar that was fraudulently manufactured in order to escape taxation. He tendered his thanks to the honourable gentlemen who had just given such a lucid

explanation, showing how the whole of the juice from the cane could be used up without any waste, and without the necessity of manufacturing rum, as there was no offal ; and it seemed to him that the sugar so made was an honest and pure article.

The AUDITOR GENERAL was understood to say that the statement of Mr. Russell had taken him very much by surprise. He (Mr. Russell) said he could take a gallon of juice and convert it altogether into crystallizable sugar. He could not gainsay that ; Mr. Russell said it had been done in this country, and for the first time : and he (the Auditor General) would say it was the first time it had ever been done in any country. He would be very glad to see what kind of crystallizable sugar it was. With regard to the other statements made, all he could say was that it was desirable that both sides of the question should be known, more particularly as it was a question of so much importance to the colony. If the United States Government looked on the sugar as fraudulent, it was no good saying that it was not fraudulent. The thing was to find out whether they could come to an agreement with the Government of the United States, because if they could not export their sugar there it must be a great loss, and a loss was not to be encountered with complacency. He thought the case ought to be looked into with the greatest closeness and investigation, and although he must confess that the remarks made were very strong, yet he had read the despatch from the United States and he thought it was a very able one, and he knew that the Americans were not in the habit of taking a stupid view of things.

Mr. RUSSELL said it was not a new discovery to convert the whole of the crystallizable matter in the cane juice into a solid mass for export. What was known as Fryer's concrete was freely admitted, and he believed could be imported into the United States under a certain duty. In Greenock, where what was known as the "Scotch system" was kept up, the whole of the Manilla's, Cuba's, and our sugar was reduced to a syrup similar to what went into our vacuum pans ; all the dirt was removed by the aid of charcoal, but for the last five years not a single gallon had gone out of it. The whole was converted into a dry product. He only wished to point

out that there was nothing inconsistent in his telling them that he manufactured sugar in that way at the present time ; and his buildings were at work and open to inspection by any gentleman who wished to go there and see the sugar manufactured. It was what he considered to be a thoroughly honest manufacture.

The AUDITOR GENERAL said he understood the honourable gentleman to say he could convert a gallon of cane juice into a gallon of crystallizable sugar. He knew what concrete was, but that was not crystallizable sugar. He supposed he had made a mistake.

Mr. RUSSELL said it was quite possible the Auditor General never examined concrete through a glass, or he would find that it was an entire block of crystallizable sugar.

Correspondence.

GILL'S PROCESS.

To THE EDITOR OF "THE SUGAR CANE."

SIR,

My attention has been directed to the letter of Mr. Bellairs in your Magazine for this June. It bears the heading "Gill's Process." I respectfully submit that the more suitable heading would have been "Mangling done here;" for my process was wilfully maimed in both of those experiments to which reference is made.

In the first experiment, Mr. Bellairs capriciously set aside the possibility of realising the product which my process had obtained, and claims superiority for the product by the old lime process. As to the second experiment, it was not my process at all, being corrupted by or with Mr. Bellairs' *quasi* improvements, which duly came to grief. That gentleman goes into particulars, and leaves it to be inferred that they describe his progress with my process, whereas they only betray the *animus* of the author of that miserable failure. In this second experiment we again see the preference of Mr. Bellairs for the exercise of his superior judgment, and we see the further he

wandered in that direction, the more severe became his punishment; perhaps deservedly so.

I freely admit that we should have been wiser with reliable information; and that if Mr. Charles Williams had conducted those experiments, his results could have satisfied everyone interested in the question. I will indulge the hope that experiments with my process may yet be confided to the scientific rigour and technical experience of that gentleman, whose conclusions will be confirmed, and, if possible, increased in value by the stern realities of Mr. Hollings, obtained in Montserrat, who also is a personal stranger to me.

Yours faithfully,

W. EATHORNE GILL.

45, South Hill Park, Hampstead.

BONNEFIN'S PROCESSES.

Paris, May 21st, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

I had the pleasure of reading the certificate of M. Poculot in this month's *Sugar Cane*. I now ask you to publish in your next issue the following extract from the last letter I had from that gentleman, dated the 5th April, 1880:—

Je viens ces jours derniers de faire inopinément la découverte d'un argument d'une grande valeur en votre faveur et qui ne peut que renforcer ma conviction à l'égard de votre procédé de filtration.

En mettant de l'ordre dans mon bureau, j'ai mis la main sur un flacon de jus recueilli sous vos filtres le 18 Decembre 1879. Le flacon étiqueté ne me laissait aucun doute sur sa provenance.

Ce jus que j'ai encore et dont j'ai apporté l'échantillon à Evenor Manès, présente un aspect de limpidité parfaite, pas le moindre troublé, il n'y a pas trace de dépôt à en juger que par la vue, on croirait à un état de conservation parfait.

En débouchant le flacon, et en flairant le contenu vous vous trouvez en présence d'une fermentation franchement alcolique.

Ainsi à l'inverse de ce que nous constatons, soit sur des vesoux,

soit sur des jus concentrés, (aussi bien épurés qu'on puisse le supposer par la défécation, le sabrage et le filtrage) le phénomène de la fermentation, s'est produit sans troubler la liqueur, sans lactescence, sans viscosité, sans donner le moindre dépôt.

Que s'est il donc passé dans ce jus? Quelle en est la nature? La réponse ne peut être que celle ci. Ce jus constituait une solution sucrée pure. *La filtration capillaire agissant avec une puissance que je ne soupçonnais pas être aussi grande, à éliméne tous les corps étrangers: et même la partie granulaire ou albumineuse, découverte par le Docteur Jcery.* Ajoutez que ce jus est dans le même état de coloration naturelle—coloration blonde—que le premier jour.

Mettions nous, maintenant, en présence de ce jus traité "*illoco*" (this means at once) pour être transformé en sucre, évaporé dans le Vide, et à basse température. Quel rendement obtiendra-t-on? Cette remarque fait réver M. Manès. Il y à de quoi!

Je me reporte ensuite à votre expérience d'extraction du jus de la pulpe *par les cylindres en bois* de votre laveuse mécanique, et je me demande ce que sera notre industrie Coloniale quand nous aurons en mains l'épuration de nos jus de cannes et l'extraction par la pulpification.

TRANSLATION.

I have just recently made a discovery of great value in your favour, which strengthens my previously expressed convictions with regard to your process of filtration. In putting my office in order, I placed my hand upon a flask of juice obtained from your filter, on the 18th December, 1879. The flask had been duly labelled, which left no doubt about the date of its production. This juice, of which I still have a sample, and a portion of which I took to Evenor Manès, presents an aspect of perfect limpidity—not the least thickened: There is no trace of deposit, and judging by sight, it is in a state of perfect preservation.

On opening the flask, and smelling at its contents, a fermentation decidedly alcoholic was perceptible. Thus—inversely to what we find, whether in normal or concentrated juices,—it was as pure as if it had been treated by defecation, *sabrage*, and filtration; and

the phenomenon of fermentation had been produced without disturbing the liquor—without lactescence, without viscosity, or the slightest deposit. What has, therefore, happened to this juice? What is its nature? The answer can only be this,—it consisted of a pure sugar solution. Capillary filtration—acting with a power I did not expect—had been so great as to eliminate all foreign substances, even the granular and albuminous parts discovered by Dr. Icerry. Let me add that the juice retains the same natural colour—pale yellow—as it had at first.

Let us now consider, with a juice already in a condition for being transformed into sugar, evaporated in *vacuo*, and at a low temperature, what return we ought to obtain. This observation made in the presence of M. Manés, set him thinking, and good reason there was for it.

Returning to your invention for extracting juice from the pulp by the wooden cylinders of your mechanical washer, I ask, what will our colonial industry become when your system of purification of cane juice, and extraction by pulpification, shall be adopted?

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

2131. GEORGE HENRY MOORE, of Norwich, Connecticut, United States of America, Manufacturer. *An improved filtering apparatus.*

2137. CHARLES GEORGE PFANDER, of 33 and 34, St. Andrew's Hill, Queen Victoria Street, London. *Improved materials for filtration and decolourization, suitable especially for the filtration and decolourization of solutions of sugar.*

ABRIDGMENTS.

4116. JAMES JOHN MUSTO, of Clinton Road, Mile End, Middlesex, and ARTHUR WELLESLEY JOHNSON, of 22, Great Winchester Street, London. *Improvements in filter-presses and in the manufacture of parts of the same.* This invention consists firstly in the formation of an air chamber in the end plate, in substitution for a separate chamber. The second part of the invention consists in the formation around the outer part of the plates of four or more

lugs or bosses in which are inserted fixed or adjustable hooks, catching into eyelets in the four corners or other suitable parts of the filter cloths, thus securing the latter to the filter-plates with the required degree of tension without tying or folding. The third part of the invention consists in forming two extra holes in each filter-plate, so that when the plates are screwed up in the frame, the several holes form communication with one another throughout the whole series of plates. A channel is formed leading from the inlet at the bottom of the plate to every odd number chamber and another channel from the outlet at the top to every even number chamber; thus the washing liquid is caused to pass through the cakes before escaping through the outlet, and the washing liquid can be allowed to remain in the cakes for any required length of time by closing or regulating the outlet wash cock. The last part of the invention relates to a mode of facing the filter-plates and other parts of the filter-press. A frame is placed or fixed on the face plate outside the filter-plate required to be faced; the saddle or slide rest of the lathe is worked by means of two small rollers fixed to the saddle so as to work one inside and the other outside the said frame or guide, which is made of such a shape that it will guide the tool along the surface of the plate or other part required to be faced.

4389. DUGALD MAC EACHRAN, of Greenock, in the County of Renfrew, North Britain. *Improvements in the manufacture of sugar and syrups, and in apparatus to be employed therein.* This invention consists in a method of cooling sugar in a semi-liquid or other state, or syrups at any desired stage of the manufacture. The vessels may be jacketted, and cold water or air admitted into the outer casing; or cold air may be passed over the surface of the mass to be cooled, or both of these means may be employed at the same time. (This invention received provisional protection only.)

4461. GUSTAV VALENTINE ALSING, of Bradford, Yorkshire. *Improvements in filter presses.* This apparatus consists principally of two endless bands of filter cloth travelling horizontally over pulleys. These bands are placed at a suitable distance apart, and the upper band is shorter than the one below, so that the matter to be pressed may be spread on the latter at the feeding end of the machine. The bands are then caused to travel in the same direction and carry on the matter to be filtered between two frames, which are placed one exactly above the other between the upper and the under parts of each belt. The upper frame is provided with an air-tight cover, fitted with an opening communicating to an air-compressing pump, and is open below; the upper frame has a perforated top and bottom. When the matter to be heated has travelled exactly between the frames the pulleys are stopped, and the under frame is lifted up and holds the said matter between the two filter cloths against the upper frame, into which compressed air is admitted, and thus the liquid is expressed. (This invention received provisional protection only.)

4544. BENJAMIN EDWARD REINA NEWLANDS, of Clyde Wharf, Victoria Docks, Essex. *Improvements in the manufacture or refining of sugar.* This invention consists in the employment of alcohol at an elevated temperature (about 165° Fahrenheit) for the washing or elution of saccharate of lime. The inventor also distils the alcoholic solution containing the impurities resulting from the above washing in order to recover the alcohol, and converts the mass remaining in the still, and which still contains a considerable quantity of sugar, into saccharate of lime in the usual manner. This saccharate of lime is then washed with alcohol, as in the first process, and a large proportion of the sugar, which would have been lost, is thus recovered. By employing the alcohol at an elevated temperature the process is greatly accelerated, and smaller plant may be used, the results being equal, if not superior, to those obtained with alcohol at the ordinary atmospheric temperature.

AUSTRIAN.

(Patents issued during January, 1880.)

7. F. ARNOLD, of Neustadt, near Magdeburg, Germany. *A compound machine for washing raw sugar.*

39. T. BOGEL, of Brüx. *An apparatus and process for diffusing and filtering fluids or steam for claying sugar in turbines.*

98. R. FARKAC, of Schlan. *A duplex beet cutter.*

100. A. FESCA, of Berlin. *A turbine for making sugar loaves.*

153. C. HERBST, of Kuttenberg. *An osmose apparatus with super pressure.*

169. C. HUBER, of Karolinenthal, near Prague. *A circulatory cylinder for evaporators of sugar juice.*

266. F. NAPRAVIL, of Swolenowes. *A quick flow apparatus for diffusers.*

283. E. PAMPE, of Berlin. *A process for washing and saccharifying feculent substances, and apparatus belonging thereto.*

291. PERNER BROTHERS, of Elbeteinitz. *A diffusion knife.*

292. PERNER BROTHERS, of Elbeteinitz. *A diffusion knife for sugar works.*

313. F. QUISS, of Unter Bucie, near Caslan. *Obtaining a durable coating on the inside of sugar moulds.*

328. C. V. RITTERSHAIN, of Lieben, near Prague, and J. ZAHRADNIK, of Touseni, near Brandeis. *Applying undular knives for cutting beetroot.*

341. A. RUMPLER, of Hecklingen, Germany. *Process and apparatus for recovering magnesia from certain residues of sugar and bleaching works.*

387. J. SUKUP, of Napagedl. *Fastening diffusers with outlets below.*

BELGIAN.

51089. A. KASE. *A knife for cutting beetroot.*

51123. J. HAVEL. *Promptly evaporating, heating, and cooling liquids of all kinds by means of a cluster of pipes.*

51150. HANNICOTTE. *Heating beet pulp previous to pressing in continuous presses.*

51242. N. RILLIEUX. *Modifications in condensers for sugar and other works.*

51392. C. THUMB. *An apparatus for reviving animal charcoal.*

51500. J. E. BOCCUIN & J. LIPCEJNSKI. *A refrigerator for boiled sugar.*

FRENCH.

134154. BEAUVILLAIN, of Saint Denis. *Filtering and purifying sugar juice.*

134166. BOLZANO, TEDESCO, & Co. *Automatic fasteners for diffusers.*

134250. THE FIVES-LILLE COMPANY. *A continuous centrifugal apparatus.*

134290. BRUNAUD, of Port Louis, Mauritius. *A chemical combination for the cold defecation of cane liquid.*

CERTIFICATE OF ADDITION.

132791. MIGNON & ROUART. *Apparatus for varying temperature, steam condensers, and evaporators.*

GERMAN.

10098. PRINZ-CARLSHUTTE, GRAUEL, HENSEL & Co., and E. F. HAMANN, of Rothenburg-on-the-Salle. *An apparatus for a continuous diffusion in a single vessel.*

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To JUNE 19TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS. 1880.	1879.	IMPORTS. 1880.	1879.	DELIVERIES. 1880.	1879.
London	89 ..	70	163 ..	161	147 ..	137
Liverpool ..	50 ..	62	118 ..	149	111 ..	111
Bristol	5 ..	6	26 ..	29	24 ..	25
Clyde	57 ..	58	139 ..	144	115 ..	118
Total ..	201	196	446	483	397	391
Increase..	5		Decrease..	37	Increase..	6

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST MAY, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepôts.	Total 1880.	Total 1879.	Total 1878.
191	121	32	54	4	402	385	359

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST MAY, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepôts.	Total 1880.	Total 1879.	Total 1878.
947	307	26	294	194	1768 [®]	1776	1670

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	275,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	375,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland ..	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	55,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,365,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

In the early part of the month the unremunerative margin between raw and refined caused refiners to be indisposed to increase their purchases of raw sugar except at lower prices; while on the other hand holders of raw sugar, still having confidence in the future of the market, more particularly as regards medium and good refining qualities, resisted any reduction in price. The amount of business was consequently restricted to purchases from hand to mouth. Low brown sorts remained neglected, and were difficult of sale.

A better demand for refined sugars being experienced during the latter part of the month refiners have increased their purchases, and have had to pay an advance. The market closes quiet but firm.

The imports in 1880, compared with those of 1879, show a decrease of 37,200 tons, against a decrease of 28,900 tons shown last month.

The deliveries, which last month show an increase of 4,600 tons, now exceed those of last year by 6,200 tons.

The stocks of sugar on 19th June were 5,100 tons in excess of those of the same date last year, and 48,900 tons more than on 1st January, 1880.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 22s. 6d., to 23s. 6d., against 21s. 6d. to 22s. 6d.; good to fine grocery, 23s. 6d. to 25s. 6d., against 23s. 6d. to 25s. 6d.; Martinique crystals, 26s. 6d. to 27s. 6d., against 25s. 6d. to 26s. 6d.; No. 12 Havana, 25s. to 25s. 6d., against 24s. 6d. to 25s.; fair to good refining Cuba Muscovados, 23s. to 23s. 6d., against 23s. to 23s. 6d.; middling to good brown Bahia, 20s. to 20s. 6d., against 20s. to 21s.; good to fine Pernambuco, 20s. 6d. to 21s. 6d., against 21s. to 22s.; Paris loaves, 28s. to 28s. 6d., against 27s. to 27s. 9d.

THE SUGAR CANE.

No. 133.

AUGUST 2, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

THE PRESS ON THE SUGAR QUESTION.

A great struggle is being made by those writers in the press whose bitter opposition the sugar trade has unfortunately incurred, to lead their readers to suppose that the evidence taken before the Select Committee has weakened, and even destroyed the case put forward by the sugar refiners and West India producers. Our readers are fully conversant with the nature of the evidence from the abstracts of it given in these columns; but it is nevertheless desirable to deal with the statements put forth in the *Times* and elsewhere, and to show, as completely as possible, their misleading character or absolute want of foundation. We therefore give the following notes in reference to every statement contained in recent articles in the *Times* and *Saturday Review*. Since these notes were prepared similar articles have appeared in other papers and will be dealt with in due course. The article in the *Times* to which we now refer has, as will be seen by the letters addressed to Mr. Gladstone, copies of which are given in another part of our impression, been brought to the notice of the Premier, as almost unfair attempt to influence the minds of the public and of Parliament, while the the question is still *sub judice*. The *Times* begins by saying that last year the Committee heard nothing but the evidence of members of the trade, all repeating the same complaint, that they were being ruined, and that the only remedy was a countervailing duty. But now, the *Times* insinuates, that impartial witnesses have been examined, the aspect of the case is entirely changed, and as it has "utterly broken down," the only question

that remains is how best to give a *quietus* to "this absurd agitation," and expose the "scandal" created by the appointment of such a Committee. The only assertion or argument put forward by the *Times* in support of this sweeping statement is, that the export bounty in France "does not seem to exceed 1s. or 1s. 6d. per cwt." This was shown, by a letter published in the *Times* on the following day, to be a totally unfounded statement, the bounty having just been declared by the French Government to amount to 2s. 6d. per cwt. Nevertheless the *Times*, in an article of the 15th July, repeats its previous statement in a still more positive form, by saying that "the bounty *has been shown* not to exceed 1s. 6d. per cwt." This absolutely unfounded assertion has been reproduced in articles in the daily press throughout the kingdom, one editor going so far as to head his remarks "the sugar swindle."

We will now deal in detail with the article in the *Times*, and with another in the *Saturday Review*.

The remedy proposed in evidence before the Select Committee was a treaty with a clause like Clause XIX of the Convention of 1864.

Six "impartial witnesses" have been heard. Two in 1879, two in the first Session of 1880, two in the New Parliament. Their evidence confirms "the alleged grounds of the complaint" in every particular. Views expressed adverse to "the singular remedy proposed" have been shown in cross-examination to be very singular. The only other serious remedy proposed, "a reduction of wages and profits," appears singular to manufacturers and workmen, their experience, if not their knowledge of political economy, teaching them that wages and profits are reduced to a minimum by natural competition previous to the interposition of any artificial influences. These being the facts, it does not appear how the evidence of the six impartial witnesses can render the drawing up of the report a less simple process than it was before. There is not a single fact in the evidence of the six impartial witnesses which in any way justifies the assertion that the appointment of the Committee was a "scandal," or that the agitation is "absurd," or that any other "*quietus*" should be given to it than that which is consistent with justice to those engaged in a lawful branch of

British trade. On the other hand, it is a fact which can be and has been proved* from the evidence that the only attempts to controvert previous evidence turned out "absurd" and at once received a "quietus," and that it is only these parts of the evidence that have "utterly broken down." The Committee is spoken of as a scandal "in these days of free trade;" but no attempt has been made during the progress of the enquiry to show that any suggestions made to the Committee have been contrary to free trade; or if such an attempt has been made it has signally failed. The distinction between the two industries of loaf sugar and moist sugar production was clearly pointed out at the very outset of the enquiry, and therefore the confusion of the two is a distinct attempt at misrepresentation. The loss of the loaf sugar refining trade is not a small one. The minimum bounty is now admitted by the French Government to exceed 6 fr. per 100 kilos. Instead of saying, without a shadow of proof, and without specifying other causes, that "whatever the cause may be, it is *certainly not* the "French bounties alone which have disabled and extinguished loaf "sugar refining in this country," any person who is ready to accept even the estimate of the bounty just made by the French Minister of Finance must at once declare that such a bounty will inevitably ruin any trade against which it may be directed. The *Times* says that the production of moist refined sugar in this country is a very large industry, but that nevertheless it is so insignificant as only to represent a margin of two millions sterling between raw and refined; the loaf sugar industry must therefore have been very small; and though at present it is "disabled and extinguished," this is "certainly not" owing to its having to contend against French refiners who receive a bounty, according to the French Government of two pounds ten shillings a ton, and who, on the basis of the same calculation, must have received a few years ago, more than double that amount. The *Times* does not explain how the size of the French market or the checking of the French consumption can enable the French refiner to sell below cost price.

* See our analysis of Sir Louis Mallet's Evidence in Chief and Cross Examination, in parallel columns, *Sugar Cane*, 1879, page 628.

Having disposed of the sugar refiners' case on the ground that the loaf sugar refining industry, though "disabled and extinguished," is (or rather was) a small one, the *Times* examines the case of our colonial producers. Before passing to that part of the article, it may be well to point out, in reference to the smallness of the loaf sugar industry, that however small it may have been, it was the sugar refining industry of the country. The new industry of producing a partially purified moist sugar, which has been substituted for the raw sugar formerly consumed by the lower classes, has not supplanted the industry of producing refined sugar proper, that is, absolutely pure sugar. The one industry has merely sprung up alongside of the other, and it is no argument, because foreign bounties happen to have attacked one and not the other, to deduce from such a circumstance the conclusion that no injury has been inflicted. The distinction between the two industries has always been most carefully explained, but it has been pointed out that the fate which has befallen the loaf sugar manufacturer will most certainly as speedily dispose of the remaining industry of the production of moist refined sugar if foreign legislation should permit of a bounty on that kind of refined sugar. The French refiner, having gained all the advantages he can from the exportation of loaf sugar, has for some years been looking for some change in the law which may enable him to attack the other branches of the trade. That change has probably now arrived.*

The first remark made by the *Times* in reference to the West Indian part of the question is that "we are threatened with a heavy penalty for the temporary cheapness of sugar we now enjoy in the shape of absolute dependence at some future time on bounty-giving beet-growing countries after they have extinguished the competition of the cane." But the evidence has shown that this state of things has already commenced in good earnest. In spite of the enormous increase in the consumption of sugar in the last ten years, the production of cane sugar has stood still, owing to the bounty-fed production of beetroot sugar, which has more than doubled in that time. The result has been exactly what the *Times*

* See copies of letters to Lord Granville in another part of this number.

describes, though at present the dependence of the consumer on the bounty-fed sources of production has not become absolute. Nevertheless, the occurrences in the sugar market during the last four years are quite sufficiently marked to illustrate very forcibly the injury experienced by the consumer in being even partially dependent on artificial sources of supply. In the summer of 1876 the price of sugar, owing to the enormous increase in beetroot cultivation under the stimulus of export bounties in every European country, had fallen to a point never before known. The average price of all the kinds of raw sugar imported into this country was, in June, 1876, 19s. per cwt. The season turned out unfavourable to the growth of beetroot, the falling off in the crop amounted to about 300,000 tons, and prices rose 50 per cent. and continued high during the whole of the following year. The enjoyment of sugar for a short time $\frac{1}{4}$ d. a pound below cost price involved a loss to the consumer of 1d. a pound for the best part of a year. Exactly the same thing has occurred in a mitigated form in the present season. A further increase in the production of bounty-fed beetroot sugar in 1878 forced prices down even below the ruinous figure of 1876. In the summer of 1879, good West India sugar was sold at 16s. a cwt., a price at which it was impossible to produce it. Another unfavourable season for beetroot in the autumn of that year caused a falling off of about 200,000 tons, and prices rose again 50 per cent. Again the consumer paid dearly for his supposed advantage in obtaining bounty-fed sugar, an advantage which he certainly has not secured on the average of the last four years, in spite of the extremely low prices in parts of 1876 and 1879. Unsubsidized producers are discouraged by the low prices at which bounty-fed sugar can be produced, and therefore do not extend their cultivation. The bounty-fed producers are within a limited area, and therefore all subject to the influence of an unfavourable season. The result is loss to consumers as well as producers, as the experience of the last four years has proved.

It is not the loss or gain of a market which is the question, but the sale of sugar below cost price, a result which must periodically arise from export bounties. It is that which threatens our colonial producers with ruin.

It may be admitted that beetroot cultivation might, under any circumstances, supply the home consumption in European producing countries; it certainly will do so while protective duties are maintained. But it is its exportation below cost price, and that alone, which is at present complained of. Nor is the *Times* correct in saying that the production for home consumption cannot be due to the bounties, because they are only obtained by means of the export of sugar. Whatever drawback the producer obtains on the export of his sugar, he will obtain the same amount in duty from the consumer; because he will not sell to the consumer at a lower price than that which he gets for export, which is the price *plus* the drawback. He therefore obtains from the consumer the same bounty that he gets from the Treasury. With that bounty he is enabled to undersell other competitors in his own market no less than abroad.

The *Times* thinks that "a small excess of production would probably depress the price by more than the amount of the bounty," and that not more than a fifth of the European production of beet sugar can be due to the stimulus of bounties. That would be 300,000 tons, which we presume the *Times* would regard as more than "a small excess of production." This is a full admission of the complaint. More than a small excess of production is admitted. Even a small excess is declared to have the effect of depressing prices by more than the amount of the bounty—that is, far below cost price; and yet the *Times* searches diligently for other reasons than this patent one why unsubsidized producers cannot compete against such a state of things. Its search does not result in anything except the blank assertion that there are "ample causes besides bounties to account for the great growth of beetroot sugar on the continent," and for the successful competition of foreign loaf sugar. Until the *Times* can disprove the fact that beetroot sugar and foreign loaf sugar are, by means of bounties, sold below the cost of production, it matters not how many other causes there may be for their predominance in British markets. The one cause of export bounties is sufficient to account for the result. The bounties are admitted; the result is admitted; no

other causes of the result are proved; and yet our opponents rack their brains to discover the means of proving that an admitted effect is not the result of an admitted cause, in spite of the fact that the cause must inevitably bring about the effect.

The *Times* quotes Mr. Giffen's evidence as to the gain at the present time from "the extra cheapness of sugar," as an argument against any remedy being adopted. Mr. Giffen says sugar in this country is cheapened by bounties to the extent of £2,400,000 a year. In saying this he admits the whole complaint. Under natural conditions, sugar must be sold as near cost price as possible. Mr. Giffen says the consumption of this country is being supplied by bounties at a cost so much below that figure as to save the consumer £2,400,000 a year. If that be so, producers have not, as the *Times* asserts, misrepresented the state of affairs. They are, according to Mr. Giffen, being undersold to that amount. That is exactly what they themselves declare, and they maintain that this is not a permanently beneficial state of things for the consumer.

The state of the sugar market during the last four years, as already explained, confirms this view. Whatever the consumer may have gained, and may still gain at certain times, he most assuredly lost heavily when the reduction of the beetroot crop in 1876, and again in 1879, caused the price of sugar to jump up more than a penny a pound.

The *Times* says that "the bounties, at most, only cause a diversion of labour and capital from one industry to another." But what becomes of the capital sunk in the industry attacked? And what becomes of the workmen in the industry to which bounties divert a sudden supply of superfluous labour?

Considering that the main supply of raw sugar for British refiners,—that from our West India colonies,—is at present seriously jeopardised by the bounties, it is not clear how any remedy for bounties, which should restore perfect freedom of competition to all, is likely, as the *Times* suggests, to hinder refiners in obtaining supplies of the raw material. This is a curious outcome of the ostentatious apparent purism of the *Times* in economic science. It is because we want a constant supply of sugar from all

quarters that we ask for a restoration of free and equal competition for the whole world.

The *Saturday Review* has followed suit with an equally bitter attack on the refiners and producers of sugar, showing how easily one leading press writer can poison the minds of the whole of that literary community.

What we have said in reference to the *Times* article sufficiently disposes of the greater part of that in the *Saturday Review*. We will turn at once, therefore, to the figures it quotes from Mr. Giffen's evidence. The Reviewer thinks the complaint that bounty-fed sugar is now being sold below cost price is disposed of by showing that less sugar was produced in 1853 than in 1873. Let us turn, however, to the progress of cane sugar production since the time when bounties began to operate. The following questions were put to Mr. Giffen and received the following answers:—

Question. "Between 1865 and 1878, beetroot had advanced 200 per cent. and cane had advanced about 10 per cent.?"

Answer. "That is quite so; the growth in beetroot is enormous since 1864."

Question. "In 1871 it was a growth of 873,300 tons, and in 1878, 1,420,000, or about 63 per cent., while in the same period cane production increased 1½ per cent.?"

Answer. "That is so on the figures."

Question. "During all this time there was a very large increase in the consumption of sugar in the United Kingdom?"

Answer. "A large increase in the consumption both in the United Kingdom and the United States I think, and perhaps in other parts of the world as well, although not upon the continent I think."

Thus Mr. Giffen is obliged to admit, on his own figures, that from 1871 to 1878, while consumption was increasing by rapid strides everywhere but on the continent, the production of sugar was standing still everywhere but on the continent, where it increased 63 per cent. Can there be a more eloquent statistical illustration of the effect of export bounties?

The Reviewer admits that cane sugar production in our West India colonies had not increased as much as European beetroot

sugar, and says that "possibly the bounties may have something to do with it." But he thinks it more likely to be due to want of capital, skill, and intelligence, unwise legislation by local Parliaments, disorganization of industry, and race animosities.

If that be so, how is it that during the last ten years the production of sugar in other countries, against which none of these hypothetical objections can be raised, has also stood still? The French West Indies have stood still, though full of the newest machinery and modes of manufacture; Java has stood still; so have Mauritius and Réunion. Dutch and French Guiana, Cuba, Porto Rico, and Brazil have actually declined; and yet continental Europe, the only country that does not rapidly increase its consumption of sugar, increases its production by leaps and bounds. The reviewer does not attempt to call in question the fact that this European production receives a bounty, and that sugar is therefore sold below cost price; and yet he goes out of his way to try to show, by going back to 1853, that no injury is being inflicted on unsubsidized producers.

The Reviewer states that the importation of foreign loaf sugar into this country had increased from 262,000 cwt. to 3,136,000 cwt., and he thinks "it is quite possible that the bounties have stimulated this enormous growth of the import of refined beet sugar." But though he makes this reluctant admission, and though he knew, or ought to have known, that the present reduced bounty, as estimated by the French Government, is 2s. 6d. per cwt., he persists in seeking for some hidden cause, when the admitted bounty is not only quite sufficient to, but must inevitably bring about this transfer of the manufacture. He thinks French refiners are more skilful. If so, why do they require a bounty? We are told by political economists that the inevitable result of protection is inferior manufacture. The late M. Chevalier is quoted by the Reviewer as his authority, but as M. Chevalier had never seen an English loaf-sugar refinery he had no means of forming the opinion he so gratuitously expressed, which really amounted to nothing more than the characteristic boast of a Frenchman.

The conclusion to be drawn from Mr. Giffen's figures is exactly the reverse of that arrived at by the Reviewer. As we have

pointed out, they show that the whole of the recent largely-increased consumption of the world has been supplied by a protected and bounty-fed industry, and that the production of loaf sugar for consumption in this country has been largely transferred to the foreigner. This is all that the West India producers and British refiners have ever stated in illustration of the fact that bounty-fed sugar is sold below cost price, to their great detriment and eventual ruin. Their case, instead of "falling to the ground," is confirmed by Mr. Giffen's figures.

THE TIMES ARTICLES.

THE LATEST FRENCH OFFICIAL ESTIMATE OF THE EXPORT BOUNTY.

The following letters have been addressed to Mr. Gladstone:—
(No. 1.)

9, Mincing Lane, 24th June, 1880.

THE RIGHT HON. W. E. GLADSTONE, M.P., &c., &c.
Sir,

We desire to call your attention to a leading article in the *Times* of the 22nd inst., on the Select Committee on Sugar Industries and to state that we are prepared to prove from the evidence that the statements it contains are either contrary to or perversions of the facts, or simply unfounded assumptions.

We consider this article to be a most unfair and unjustifiable attempt to influence the opinion not only of the public and of Parliament but also of members of the Committee, and to approach to a breach of the privileges of Parliament.

I beg to enclose a copy of a letter addressed to the *Times*, on the main point in the controversy, in which I was enabled, by the timely appearance of the French *projet de loi*, to give the exact and most recent estimate of the French Government as to the amount of the export bounty in that country.

I am, Sir, your obedient Servant,

(Signed) JAMES DUNCAN,
Chairman, British Sugar Refiners' Committee.

9, Mincing Lane,
(No. 2.) 13th July, 1880.

THE RIGHT HONOURABLE W. E. GLADSTONE, M.P., &c., &c.
Sir,

On the 24th of June, I ventured to address to you a letter, by the desire of my committee, calling your attention to a leading article in the *Times* of the 22nd of that month on the Select Committee on Sugar Industries, and stating that we were prepared to prove from the evidence that the statements it contained were either contrary to, or perversions of facts, or simply unfounded assumptions. My committee desired to make this statement to you because they considered the article to be a most unfair and unjustifiable attempt to influence the opinion of the public and of Parliament previous to the report of the Committee, and even, if possible, to affect that report.

I am now desired, for the same reason, to call your attention to subsequent conduct on the part of the *Times*, and my committee instruct me most respectfully to ask, the Select Committee having ceased to take verbal evidence, whether Her Majesty's Government would cause the statement I am about to make to be laid before the Select Committee. If this is not done, the further unfounded assertions in the *Times*, to which I am about to refer, will remain unanswered and may affect the minds of members of the Select Committee in a way quite the reverse of that in which they would be likely to influence them if the actual facts were permitted to come to light.

In my former letter to you I did not enter into the details of the *Times'* article, nor did I attempt to write to the *Times* a detailed reply, knowing from experience that such a letter would not have appeared. But, as the real point in the whole question is whether there be a large bounty on the exportation of refined sugar from France, and as the *Times*, in that article, assumed without a shadow of proof that the bounty is too small to have the effect of which we complain, I was content to avail myself of the opportune appearance of the new French bill on the sugar duties to point out that the French Government, in the preamble to that bill, admitted

a bounty exceeding 6 francs the 100 kilos. That short letter, a copy of which I enclosed in my letter to you of the 24th ult., was published by the *Times*, but was immediately followed by a long letter, signed "Expertus," contradicting my assertion. Within a few hours of the publication of that contradiction, I despatched a reply to the *Times*, proving the correctness of my statement; and, on the following day, I sent a further communication dealing in detail with each point in the letter of "Expertus," and showing, I venture to think, indisputably, that his statements were incorrect and his arguments fallacious. Neither of these replies was published. We are accustomed to this treatment from the *Times*, but on the present occasion more is at stake than the mere misleading of the general reader. An official enquiry is going on, and we must, therefore, endeavour to put on record, in the only effectual way now open to us, our reply to statements which the *Times* desires its readers to accept as true.

The assertion of the *Times*, as to the amount of the French bounty, was that "it does not seem to exceed 1s. or 1s. 6d. per cwt." I might have replied by repeating the calculations so frequently given of the *minimum* amount of the bounty, as stated, not by us, but by the French sugar manufacturers. I say "*minimum*" because it is well known and admitted that errors take place in the sampling of raw sugar in France, which practically cause an unlimited—certainly, an incalculable—extension of the bounty. But, fortunately, the official copy of the new French bill had just come to hand, and I was, therefore, able to give the most recent estimate from that high official source which has, hitherto, been disposed to minimise the bounty. This estimate is, of course, strictly a *minimum*, disregarding as it necessarily must any bounty arising from incorrect samples.

The statement in my letter in the *Times* of the 23rd ult. is based on the following passage at page 9 of the *Projet de loi (Exposé des Motifs)* :—

"On peut évaluer à 16,687,177 kil. les quantités de raffinés qui auraient été imposées en plus sous le régime de l'impôt au degré, et à 272,489,598 kil. celles qui sont réellement

entrées dans la consommation. Or, comme il a été perçu 187,640,397 fr., le droit moyen payé au Trésor est de 68 fr. 86 c., par 100 kil. de sucre raffiné, soit, chiffres ronds, de 69 fr.

"En se reportant aux cours de la Bourse de Paris, on voit que, depuis longtemps, le prix du sucre raffiné livré à la consommation intérieure dépasse de 75 fr. la cote du même sucre vendu pour l'exportation. Ce chiffre, qui représente le prix des certificats d'exportation et qui est aussi l'expression de l'impôt supporté par le consommateur, dépasse de 2 fr. environ la taxe spéciale du sucre raffiné (73 fr. 32 c.), et de 6 fr. la moyenne de l'impôt réellement encaissé (68 fr. 86 c.)".

The quantity of raw sugar on which duty was paid in France, in 1878, was 273,469,870 kilos. The duty was levied according to an estimated yield of 255,802,421 kilos. of refined sugar. But the French Government state, in the *Exposé des Motifs* of their Bill, that they believe, from the analysis of the sugar, that it really yielded 261,539,858 kilos. The quantity entered for temporary admission, that is, for exportation after refining, was 227,960,787 kilos., which was estimated to yield 182,298,033 kilos. of refined sugar, that is to say, that when that quantity of refined sugar was exported the obligation with respect to duty on the 227,960,787 kilos. of raw sugar was discharged. But the French Government state their belief that this quantity of raw sugar really yielded 193,247,773 kilos. of refined sugar, and that therefore, in addition to the above estimated quantity of 261,539,858 kilos. of refined sugar, a further quantity of 10,949,740 kilos. really entered into home consumption, making a total of 272,489,598 kilos. actually consumed. But the amount of duty received was only 187,640,397 fr., and as the total quantity actually consumed is estimated, as above, at 272,489,598 kilos., the amount of duty actually paid by the refiner, per 100 kilos. of refined sugar, was only 68 fr. 86 c. But the refiner sold the certificates of exportation at 75 fr. per 100 kilos. of refined sugar exported, and he received from the consumer a duty paid price exceeding by 75 fr. the price in bond. The refiner therefore received, both on what he exported and on what he sold for home consumption, 6 fr. 14 c. more than he had paid.

The passage I have quoted means, therefore, that the refiner has paid a duty equivalent to 68 fr. 86 c. per 100 kilos. of refined, while he has received from the consumer or from the Treasury 75 fr. per 100 kilos. on the whole of the refined sugar produced by him, whether it has gone for home consumption or exportation. The minimum bounty is therefore the difference between the 68 fr. 86 c., which the French Government show to have been the most the refiner can have paid, even if the samples of raw sugar have correctly represented the bulk, and the 75 fr. which the French Government knows the refiner has received, either in duty from the consumer or in drawback.

I append a copy of my replies to the letter of "Expertus," which have been excluded from the columns of the *Times*, and I add a note on the mis-statements contained in the leading article of the *Times* and in a more recent one in the *Saturday Review*. It is peculiarly unfortunate for us that some of those who have thought proper to carry on an unscrupulous opposition to us are intimately connected with the Press.

I am, Sir, your obedient Servant,

(Signed) JAMES DUNCAN,
Chairman of the British Sugar Refiners' Committee.

EXTRACTS FROM UNPUBLISHED LETTERS TO THE
TIMES, IN REPLY TO "EXPERTUS."

(No. 1.)

* * * Your correspondent "Expertus" has rushed somewhat too hastily into a subject which requires considerable previous knowledge, and has only succeeded in doing what he accuses us of, namely, importing mystification into a question which in our opinion pre-eminently requires accurate knowledge and a clear head. As to that accusation I have only to say that the voluminous Parliamentary papers on this subject show that we have been most careful to state our case fully and distinctly; and that, as to estimates of the French bounty, we have furnished the Foreign

Office with calculations made by the central committee of French sugar manufacturers—calculations which have never been disproved either in France or England, and are now fully confirmed by the French Government.

The letter of "Expertus" is indeed a mystification from beginning to end. The passage in the *projet de loi* upon which I based my statement runs as follows :—

(Translation.)

"The additional quantity of refined sugar which would have paid duty, under the system of duty per degree, may be estimated at 16,687,177 kilos., and the total quantity that really entered into consumption at 272,489,598 kilos. But, as 187,640,397 fr. were received as duty, the average duty paid to the Treasury is 68 fr. 86 c. per 100 kilos. of refined sugar, or in round numbers 69 fr. On referring to the quotations on the Paris Bourse, it is found that for a long time the price of refined sugar delivered for home consumption has exceeded by 75 fr. the quotation of the same sugar sold for exportation. This figure, which represents the price of the certificates of exportation, and which is also the expression of the duty supported by the consumer, exceeds by about 2 fr. the special tax on refined sugar (73 fr. 32 c.), and by 6 fr. the average of the duty really received (68 fr. 86 c.)"

Nothing could be plainer than this. The refiner pays a duty equivalent to 68 fr. 86 c. per 100 kilos. of refined. He receives from the consumer 75 fr. per 100 kilos. on 272,000,000 kilos., and he receives 75 fr. on every certificate of the exportation of 100 kilos.—the average exportation being 180,000,000 kilos. He therefore receives the difference between 68 fr. 86 c. and 75 fr. on a total quantity of refined sugar of 452,000,000 kilos. This is quite irrespective of what he gains by the defects inherent in the system of saccharimetry, and by the most important defect of the system, inaccurate samples.

I will briefly illustrate the result of this bounty. The French refiners are buying cargoes of Java sugar as they arrive in the channel for orders, and are selling their refined sugar at a difference of about 9d. per cwt. After giving the refiner credit for the

greatest skill in extracting the largest possible quantity of sugar at the lowest possible cost, this shows a loss of considerably more than 3s. per cwt. I desire to lose not a moment in giving you this detailed explanation and justification of my previous statement. As to the "mystifications" of "Expertus," I will deal with them in a further letter. * * *

(Signed)

JAMES DUNCAN.

9, Mincing Lane, 26th June, 1880.

(No. 2.)

The first contention of "Expertus," in his letter of the 26th inst., is that, in reference to the construction I put upon some paragraphs and calculations in the preamble to the new French *projet de loi* on the sugar duties, "there is no such admission" of a bounty of 6 fr. per 100 kilos. on the total production of the French refineries.

To this I have replied in my brief answer of the 26th, by quoting the text of that part of the *Exposé des Motifs* to which I referred, which makes it perfectly clear that the refiner pays duty at the rate of 68 fr. 86c. per 100 kilos., while he receives from the consumer 75 fr. per 100 kilos., and a drawback of the same amount on his exportations. The two together come to the quantity and amount I stated.

2. "Expertus" goes on to state that this difference ought only to be calculated on the home consumption. He forgets that part of the paragraph which says: "This figure (75 fr.), which represents the price of the certificates of exportation, and which is also the expression of the duty supported by the consumer," &c.

Perhaps he is not aware that the refiner receives a certificate on exportation, and that he sells this certificate at a price which may be found quoted in the daily price current of the sugar market, the average price being above 75 fr. per 100 kilos. If, therefore, "Expertus" admits that the refiner gets a benefit of 6 fr. 14 c. by receiving 75 fr. from the consumer as duty, when he has only paid 68 fr. 86 c., he must also admit that the refiner receives the same benefit on exportation, by receiving 75 fr. when he has only been debited with duty at the rate of 68 fr. 86 c.

3. The next contention is, that part of the 6 fr. 14 c. which the refiner receives from the consumer, over and above the duty he has paid, is "not a bounty," but "a reduction of the French duty to the public in France." "Expertus" is informed by the French Minister of Finance that the refiner pays 68 fr. 86 c. duty per 100 kilos. of refined, and receives from the consumer 75 fr. per 100 kilos.; and from this he infers that there is "a reduction of the French duty to the public in France." He would have been correct if he had said "to the refiner, but not to the public."

It must be quite clear—apart from the distinct statement in the French bill—to anyone who cares to consider the point, that in any country where there is a bounty on export, under conditions similar to those in France, the same bounty must be received on the quantity going for home consumption. In France the refiner gets 75 fr. on exportation, and therefore he makes the consumer pay 75 fr. In Austria the sugar manufacturer gets a drawback larger than the duty he has paid. He makes the consumer pay an increase in price equivalent to that drawback.

4. "Expertus" says, "it is an internal arrangement of the French people, with which we have nothing to do." No doubt, a French export bounty is an internal arrangement of the French people, but it is one which vitally affects us, and with which our Government have had a good deal to do for many years, with the view, in Mr. Gladstone's opinion, of benefiting British consumers and producers, by securing equal trade and freedom of trade.

5. The next statement of "Expertus" is more extraordinary still. He says 2fr. of the 6fr. "is the difference between the price of the French certificates of exportation and the amount of the French duty on refined sugar." His previous argument was that the difference of 6fr. 14c. (between 68fr. 86c., the actual duty paid by the refiner, and 75fr., "the price of the certificates of exportation, and also the expression of the duty borne by the consumer,") "is only a calculation relating to the home consumption;" and now he contends that part of it has nothing to do with the home consumption, but is the difference between the price of the certificates of exportation and a practically fictitious duty on refined

sugar. The actual duty paid by the consumer is, as we are now told by the French Minister of Finance, 75 fr. The duty which refined sugar would pay, if any were imported from French colonies, is 73 fr. 32 c. The duty which refined sugar imported from elsewhere would pay is several francs higher. The refiner most distinctly gains 6 fr. 14 c. by paying 68 fr. 86 c. and receiving 75 fr., and yet "Expertus" wants us to believe that "nearly 2 fr. of the above 6 fr." is gained by mysteriously subtracting the imaginary number 73.32 from 75.

6. This difference, between the duty on imaginary refined sugar imported from French colonies and the drawback received by the French refiner, represents, we are told by "Expertus," "the extra price which the refiner pays for inferior sugar adapted to his manipulation for bounty purposes." This is so complete a "mystification" that it will hardly be necessary to discuss it further, until the connection between the inferior raw sugar supposed by "Expertus" to be refined in France, and the duty on colonial refined sugar supposed by "Expertus" to be imported into France,—neither of which things exist,—is further explained. This imaginary 2 fr., therefore, must not be deducted from the 6 fr. bounty stated in the French bill.

7. "Expertus" imagines, because the French refiner gets his raw sugar assessed at a lower rate of duty than it ought to pay, that therefore he uses "inferior sugar." The fact is exactly the reverse. The reason why the French refiner gets a bounty is because he uses superior sugar at an inferior duty.

8. The result of all these curious calculations of "Expertus" is that he succeeds in reducing the present estimate of the French Government as to the bounty to a sum more than double the estimate given by M. Léon Say last year, to which Mr. Giffen, the head of the Statistical Department of the Board of Trade, in his evidence the other day, pinned his faith. The trade have been told that they ought not to be listened to because the estimates of the bounty vary so much. But the trade estimates, whether French or English, have been consistent, and supported by calculations which, though dogmatically contradicted, have never been disproved. It is only when we come to other estimates that we

meet with these violent fluctuations. M. Ozenne, the late Secretary-General at the Ministry of Commerce, used to say there was next to no bounty, and that was at a time when the bounty was much larger than it is now. Then M. Léon Say, in 1878, hazarded an estimate of about £90,000. But the next year he gave another estimate in detail, which nearly doubled his former one. The head of our Statistical Department of the Board of Trade says this latter estimate is correct. But immediately afterwards the Ministers of Finance and Commerce declare that the bounty is 6fr. 14c. the 100 kilos., even supposing every sample to be correctly taken and every analysis correctly made or assumed.

* * * * *

(Signed) JAMES DUNCAN.

9, Mincing Lane, 28th June, 1880.

THE NEW FRENCH LAW AND THE EXPORT BOUNTY.

The following letters have been addressed to Lord Granville :—

No. 1.

LETTER FROM THE CHAIRMAN OF THE BRITISH SUGAR REFINERS'
COMMITTEE TO EARL GRANVILLE, K.G.

9, Mincing Lane, 16th June, 1880.

My Lord,

I am desired by my committee to call your Lordship's attention to the nature of the Bill brought in by the French Minister of Finance for a reduction of the sugar duties in France.

The duty is to be levied on raw sugar in proportion to the quantity of refined sugar it is presumed to yield, as estimated by the system of saccharimetry to which the representatives of Great Britain and Holland have strongly objected at recent international Conferences, as being insufficient to prevent the payment of export bounties.

All kinds of refined sugar, whether in the form of hard or soft, white or yellow, dry or moist sugar, are now to be admitted for exportation, and will be allowed to discharge the debit account of duty on the raw sugar in proportion to the quantity of refined sugar they may be presumed to represent, as estimated by the system of saccharimetry. Hitherto the French refiners have obtained their

export bounty by means of the incorrect assessment or estimation of the yield of the *raw* sugar only. By this new Bill they will obtain another bounty by the incorrect estimation of the strength of *refined* sugars; and thus, though the advantage gained at one time on each kilogramme of sugar will be reduced in the proportion of four to seven, the opportunity will be afforded of gaining it twice instead of once.

Hitherto the French refiners have obtained an export bounty only on loaf sugar, by means of which they have superseded British loaf sugar refiners in British and foreign markets. By this new Bill they will obtain a bounty on all other kinds of refined sugar, and will thus be enabled to supersede the existing makers of refined sugar in this country, who have hitherto not been so seriously affected by the bounty on loaf sugar.

With the reduction in the amount of the existing bounty the French refiners will, no doubt, as the Austrian manufacturers have repeatedly done, under similar circumstances, devise new methods of increasing it. The new law, in addition to doubling the opportunity, as I have pointed out, affords one fresh and important means of increasing to an indefinite extent the bounty to be obtained on the new exportation of *moist refined* sugar. In estimating the yield of raw sugar, the glucose or uncrystallisable sugar is deducted from the crystallisable sugar. A raw sugar, therefore, which contains 90 per cent. of crystallisable sugar, and 3 per cent. of uncrystallisable, will be charged with duty only on 87 per cent. But in estimating the sugar in a moist refined sugar, the glucose or uncrystallisable sugar is not to be deducted. A moist refined sugar, therefore, containing 90 per cent. of crystallisable sugar, and 3 per cent. of glucose or uncrystallisable, will receive drawback on 90 per cent.

I am desired by my committee most respectfully to urge upon your Lordship these objections to the French project of law, and to express the hope that your Lordship will bring them to the notice of the French Government.

I am, &c.,

(Signed) JAMES DUNCAN,

Chairman of the British Sugar Refiners' Committee.

The Right Hon. the Earl Granville, K.G., &c., &c.

No. 2.

LETTER FROM THE CHAIRMAN OF THE BRITISH SUGAR REFINERS'
COMMITTEE TO EARL GRANVILLE, K.G.

9, Mincing Lane, 28th July, 1880.

My Lord,

Since I addressed to your Lordship my letter of the 16th ult., in reference to certain provisions of the new French law on the sugar duties and their effect on the export bounties, important modifications have been introduced into the measure, to which I am desired by the Sugar Refiners' Committee to direct your Lordship's attention.

The report of the Budget Commission states that the Chambers of Commerce of Marseilles, Nantes, and Bordeaux have, in the interests of the refinery, asked for modifications on several points in the Bill, and that the Commission have, therefore, in accord with the Government, proposed to alter certain clauses of the Bill. The Bill thus modified has now become law.

1. The first modification to which I am instructed to direct your Lordship's attention is that in reference to the coefficient for deduction for glucose.

The preamble to the Bill says (page 8) that "it is now generally admitted that the coefficients of the deductions to be made from the saccharimetric figure leave too great a margin in refining, and that it would suffice to limit them to 4 for the ash and 1 for the glucose." The coefficients were therefore so fixed in the Bill.

The report of the Budget Commission says (page 32) that "the refiners of the ports have objected to the coefficients as insufficient. They have supported their claim on the ground that according to commercial usage the coefficients are 5 for the ash and 2 for the glucose." The report continues: "The Government have not considered it right to give satisfaction as regards the coefficient for ash, which they maintain at 4; but they consent to raise to 2 the coefficient for glucose, that figure being not only established by usage but also the one proposed by the Administrative Commission of 1876."

On this alteration, and the reasons given for it, my Committee desire to make the following observations:—

In my letter of the 16th of June your Lordship's attention was called to a remarkable provision of the Bill, by which a quantity of crystallizable sugar equivalent to the quantity of glucose contained in the raw sugar is to be deducted from the crystallizable sugar on which duty is chargeable, while on the exportation of moist refined sugar no such deduction is to be made in estimating the quantity of crystallizable sugar to be accepted in discharge of the duty thus debited. It is evident that the exportation of moist refined sugar will, by this provision, enable the refiner to discharge his debit of duty with a smaller quantity of crystallizable sugar than that on which the debit of duty had been calculated. According to the original Bill, the quantity of crystallizable sugar which the refiner would thus obtain free of duty would be equivalent to the quantity of glucose presumed to be contained in the raw sugar. Under the Bill as amended, which has now become law, this gain to the refiner will be equivalent to twice the quantity of glucose supposed to be present in the raw sugar.

With regard to the reasons given in the report of the Budget Commission in justification of this increase in the coefficient for glucose, my committee desire to point out, in the first place, that the Administrative Commission of 1876 was unable to determine the value of the coefficient on any scientific basis, and was, therefore, obliged to fall back on the usages of commerce.

The report says (Commercial, No. 18, 1876, page 100): "For nearly a year the sale by analysis has become one of the commercial habits of the ports; all the sugars on the spot are bought in this manner, and in all the authenticated contracts which we have had in our hands we have always seen the glucose, multiplied by the coefficient 2, deducted from the saccharimetric valuation. In the presence of the inability of science to express in exact figures the influence of the glucose—an influence on the importance of which she has, nevertheless, no doubt—we propose to refer to commercial usage, and to assign to glucose the coefficient 2."

It is well known that this usage has been established entirely

by the refiners, the merchants being quite ignorant of such technical details. It is also well known that previous to the introduction of the coefficient 2 by the French refiners, the coefficient 1 was used by those who were in the habit of estimating by analysis the yield of raw sugar. The preamble to the Bill distinctly states that "it is now generally recognised" that the coefficient "leaves too great a margin in refining," and that it should be limited to 1.

In the second place, my committee desire to point out that the report of the Administrative Commission of 1876 met with considerable criticism at the international Conferences held in Paris in that year. M. Toe Water, one of the delegates of the Netherlands Government, made the following observations (*Minutes of Conferences, Commercial*, No. 18, 1876, page 39) :—

"While rendering homage to the ability and scrupulous care of these *savants*, M. Toe Water retained the doubts which he already held on the intrinsic merits of a system of saccharimetry employed as a means for determining the amount of duty. He was struck, first of all, with the uncertainty which still existed, even in the scientific world, as to the exactness of the scientific data which served as a basis to the saccharimetric system. He noticed, in effect, in the report of M. Aimé Girard, the statement and development of several principles contrary to the present received views, and distinctly in opposition to those of Professor Gunning. * * Thus, again, glucose found in raw sugars was considered by M. Gunning as not having the power to render the saccharose uncrySTALLISABLE during refining. * * It appeared difficult to M. Toe Water to take as a basis for the levying of a tax a scientific process the groundwork of which was not more certain. With regard to the coefficients 2 and 5, employed for calculating the quantity of crystallizable sugar immobilized by glucose and by the salts represented by the ash, they did not rest on any scientific certainty, and ought to be considered as simple approximations, without any other foundation than commercial usage. Now, experience has shown on several occasions, especially in the result arrived at in the calculation of tares, what was the value of commercial usage for ascertaining the truth."

M. RAHUSEN, the other delegate of the Netherlands Government,

"did not deny the value of commercial usages, but he pointed out that the errors to which they might give rise could always be corrected by the sale prices. It might be, therefore, that a commercial usage, bad in itself, would, nevertheless, be maintained without its defects being noticed or causing complaints," (page 40).

Mr. LE FEUVRE, one of the British delegates, "insisted on the difference of opinion which existed between the chemists with regard to the application of saccharimetry, and especially as concerned the power possessed by the glucose of immobilizing a certain quantity of crystallizable sugar. He pointed out, moreover, the considerable difference between the results obtained by the chemist and the product obtained by the refiners. As to the co-efficient proposed for glucose, he remarked that many chemists maintain that this substance presented little or no obstacle to crystallization. If this opinion were well founded, why deduct from the sugar the weight, and even twice the weight, of glucose? There existed, moreover, several processes (of which one is employed by two of the principal refiners of Paris, and by one of the first refiners of Liverpool) by which the glucose found in raw sugar could be entirely destroyed. It would, therefore, be a grave error to multiply glucose by the co-efficient 2, and to deduct from the yield of the sugar the figure so obtained," (page 40).

"Mr. WALPOLE, in referring to the adoption of the co-efficient 2 for calculating the deduction for glucose, made the following observations:—

"The report admits as demonstrated that "glucose has a very feeble melassigenic power," and that in certain cases "this power is even nil;" but the report does not any the less maintain a system which consists in deducting twice the glucose from the saccharimetric value, seeing "the faculty which the glucose possesses of multiplying itself in large proportions during refining." The report cites, in support of this property of glucose, some experiments made at the laboratory, in which several liquids containing glucose had been heated to a temperature of from sixty-five to seventy degrees centigrade, and often kept so for sixty hours.

"Although it may not be necessary to discuss the point as to

whether glucose possesses the faculty of multiplying itself, it can in all frankness be objected that a heating to such a temperature, prolonged to such an extent, would inevitably give exaggerated results in comparison with those obtained by the ordinary process of refining. But even in accepting for a moment these results as being within the limits of possibility, not only do they not prove that the melassigenic power of glucose is in proportion to the quantity of glucose existing in the sugar (as the system of multiplying the glucose by two would make one believe) but they establish exactly the contrary; for the Table at page 99 shows that, although small quantities of glucose might be doubled by long heating at a high temperature, the large quantities did not increase in some cases more than ten per cent. This fact by itself alone sufficed to prove that there was nothing to justify the adoption of the co-efficient 2; it even furnished reasons against its employment.

"But the experiments were, still further, open to the following criticism:—

"The liquids which contained at first but small quantities of glucose were solutions of pure sugar containing no appreciable quantities of saline matters. It is notorious to every refiner that such liquids are more liable to fermentation (and fermentation immediately turns crystallisable sugar into glucose) than other liquids which contain a much greater mixture of saline matters; for the presence of these saline matters has the effect of retarding fermentation. The experiments also take no account whatever of the precautions which all refiners take to prevent the formation of glucose during the work.

"The Table at page 109 shows that sugars with the same saccharimetric value ("titre") can contain quantities of glucose varying to such an extent that, in applying to them the proposed co-efficient, one sugar containing 88 per cent. of crystallisable sugar would give a yield about 8 per cent. less than another also containing 88 per cent. of crystallisable sugar.

"As has been already proved, the employment of such a co-efficient for glucose has no justification, the application of the proposed system would, therefore, become the source of very great errors.

"As errors quite as great would equally result from an exagger-

ated estimate of the effect of the ash in cane sugars, it is evident that (even with accurate samples) by means of an exaggerated calculation for ash and glucose the yield of sugar of ordinary quality might be very considerably lowered.

"Mr. Walpole added that he had telegraphed yesterday to Liverpool, and that he had received a reply from a well-known English refiner, Mr. Tate, who stated that he destroyed all glucose, during the process of refining.

"The co-efficient for glucose appeared, therefore, to be empirical and could not be used as the basis of a Convention," (page 43).

* * * * *

"Mr. Walpole, without entering into a scientific discussion, declared that in none of the experiments of M. Aimé Girard could be found the confirmation of the truth of the co-efficient 2 employed for determining the action of glucose. He remarked that even in his conclusions the writer of the Report, altogether despairing of being able to represent in exact figures the influence of glucose, proposed simply to refer to the usages of commerce and to appropriate to this substance the co-efficient 2. Mr. Walpole, therefore, could not refrain from again expressing his previous estimate of the empirical character of the French process of saccharimetry.

"M. AIME GIRARD pointed out that the only point on which they had certain knowledge was that glucose was formed during refining. As regards the value of the co-efficient 2, science possesses up to the present time no element which permits it to decide whether the figure is exaggerated or insufficient. It was for this reason that the French chemists have proposed to follow, provisionally at least, the usages of commerce.

"Mr. WALPOLE declared that he attached no importance whatever to commercial usages. It appeared to him anomalous that it should be science which invoked commercial usages instead of commercial usages resting on the authority of science.

"The PRESIDENT said it was precisely from having the progress of science in view that he had proposed the annual *réunion* of an international committee of delegates whose task would be to revise the amount of the co-efficients according to the improvements made

during the year. This plan, it would seem, ought to satisfy the English Delegates." (Page 44).

"M. GUILLATME (the Belgian Delegate) asked what was the coefficient in use in Holland for calculating the deduction for glucose; according to private information which he had received the coefficient was not higher than 1.

"M. RAHUSEN replied that saccharimetry being only employed by the Dutch refiners for their private valuations and as a means of check, they generally kept secret both their mode of proceeding and the results they obtained. The sales were conducted entirely according to colour and quality. M. Rahusen also remarked, moreover, that the Dutch Government would not in any case decide any technical questions of the nature of that raised by the proposition of M. Guillaume without having consulted the Dutch savants, and especially M. Gunning.

"The PRESIDENT fully admitted this reserve; he had anticipated the views of the Dutch Delegates when he proposed at the last sitting to take provisionally the co-efficients employed by commerce as a basis for an arrangement, leaving to an International Scientific Commission the care of afterwards determining the proper figure for the deductions which would have to be used both for glucose and for ash." (Page 45).

It is evident from the foregoing extracts that this deduction for glucose met with opposition from the Delegates of all the other Powers, and that the French Delegates, unable to support their proposal on any scientific basis, suggested the reference of the point to an International Scientific Commission.

2. The second modification to which I desire to draw your Lordships attention is as follows:—

Article 4 of the original Bill enacted that "sugars cannot be charged with duty, or received for temporary admission, for a yield higher than 98 per cent., or lower than 70 per cent."

The report of the Budget Commission says:

"The delegates of the refiners of the ports have objected to this minimum, which they find to be too high. Certain sugars, those of Cochin China for example, do not analyse higher, they say, than 64 or 65 per cent. The Government, admitting the justice of this

observation, has consented to reduce to 65 the lower limit of yield."

My object in calling attention to this alteration is to show that the French refiners are fully alive to the advantage to be derived from the defect in the provision I have pointed out in reference to the exportation of moist refined sugar. The class of raw sugar to which they have referred is only suitable for the manufacture of moist refined sugar, and, therefore, has not hitherto been used for refining in France to any extent. But under the new *régime* it will be the kind of sugar from the use of which the largest export bounty will be obtainable. Large quantities of this kind of raw sugar are to be obtained from various producing countries. It contains from 8 to 10 per cent. of glucose, and about 80 per cent. of crystallisable sugar. So far as deduction for glucose is concerned, the duty will therefore be chargeable on 80, minus 8 multiplied by 2, that is, 64 per cent. But when the moist refined sugar of a similar composition, into which this raw sugar would be converted, is tendered for exportation, the whole of the 80 per cent. of crystallizable sugar will be accepted in discharge of duty. The charge for duty on a hundred kilos. of the raw sugar will therefore be discharged by the exportation of 80 kilos. of moist refined sugar containing a similar proportion of crystallisable sugar and glucose. At the new rate of duty, this will give an export bounty exceeding 6fr. the 100 kilos., or 2s. 6d., per cwt. The use of this class of raw sugar, and the exportation of moist refined sugar manufactured from it, will therefore give to the refiner as large a bounty as that now estimated by the French Government to be obtained by him on the exportation of loaf sugar. This is a very serious point with regard to the existing sugar refining industry of this country. A very large quantity of moist refined sugar of this description is consumed in the United Kingdom, and is produced entirely by home refiners. It is evident from the experience of the loaf sugar refining industry of this country, which has been almost entirely supplanted by French and Dutch loaf sugar receiving an export bounty, that a bounty similar in amount, obtained on the exportation of moist refined sugar, must have a similar effect, and supplant the very important refining industry which still survives in this country.

The higher classes of moist refined sugar would of course receive a similar bounty on exportation from France, but in a proportion varying with their quality. This new export bounty in France, in addition to enabling French refiners to undersell other makers of moist refined sugar, will have the further effect of enabling them to outbid other refiners in the purchase of the lower classes of cane sugar, which will now afford to the French refiner the best opportunity of obtaining a maximum export bounty.

The bounty I have thus pointed out, and estimated in detail, is irrespective of any error in sampling, or in estimating the proportion of sugar and glucose. Errors of sampling are inevitable, and are well known to be in favour of the refiners. The testimony of M. Toe Water on this point is most valuable, his position being a highly responsible one in connection with the collection of customs and excise duties in Holland, and his experience, therefore, very great. The following passage, at page 50 of the Minutes of the Conferences of 1876, gives his views on the subject:—

“M. TOE WATER insisted upon the danger which he thought the taking of samples presented under the system of saccharimetry. Under that system the analysis of an inferior sample was sufficient to exonerate the refiner from a considerable amount of duty, whilst under the system of duty on home consumption the trader could not reap any benefit at the expense of the Treasury, except by clandestine deliveries from his refinery of sugar which he had refined there. In support of this opinion, M. Toe Water read a passage from a paper presented to the Dutch Society of Commerce by M. Surier, chemist, of Amsterdam, which had been inserted in the work of Professor Gunning. It appeared from this paper, that in some baskets of Java sugar the quantity of glucose varied from 1 to 10 per cent., according to whether the sample was taken from one part or the other. The Dutch Delegate asked to what errors the analysis of samples and the assessment of duty by saccharimetry might not lead, if applied to such sugars ?”

If the bulk of a raw sugar contains, on the average, 5 per cent. of glucose, and a sample be taken from the lower part of the package, towards which the glucose will necessarily drain, that sample will evidently contain a much larger proportion of glucose,

probably double of that contained in the bulk. The duty levied on that sample would, therefore, be 10 per cent. below that which would have been charged if the sample had correctly represented the bulk. In such a case 10 per cent. would be added to the export bounty already described.

3. The third modification to which I desire to direct your Lordship's attention is the increase in the surtax on foreign refined sugar. At present it is under 17 per cent.; under the new law it will be 31 per cent. It is, of course, of no practical importance whether the surtax be 17 or 31 per cent., it being equally prohibitive in either case; but I desire to point out that, under the Convention of 1864, the contracting countries engaged to admit each other's refined sugars without surtax. A new Convention would therefore, for this reason alone, be a very desirable arrangement.

The negotiations which have been carried on for so many years, with the view of obtaining an abolition of the bounties on the exportation of sugar, were suspended, pending the report of the Select Committee on Sugar Industries, notwithstanding Lord Salisbury's assurance to a deputation at that time, that the Foreign office would persevere with them. The Select Committee is now about to report, and we therefore trust that the time is approaching when the negotiations will be reopened. In view of such a prospect, we consider that the points in reference to the new French law, to which I have now ventured to direct your Lordship's attention, are of very great importance, and we trust that they will receive the careful consideration of Her Majesty's Government.

In conclusion, we venture respectfully to request that, as the points contained in this letter have an important bearing on the subject now under the consideration of the Select Committee, and as no further opportunity will be afforded to the trade of placing the facts here stated before the Committee, a copy of this letter may be furnished to the Committee.

I am, &c.,

(Signed)

JAMES DUNCAN,

Chairman of the British Sugar Refiners' Committee.

The Right Hon. the Earl Granville, K.G., &c., &c.

A STRATHAVEN STATISTICIAN.

At the conference on the sugar bounties question, held at Greenock, on Wednesday, the evidence with respect to the sugar trade of that town, recently given before the Parliamentary Committee by Mr. Robert Giffen was criticised with great, and we fear not unwarranted, severity. Mr. Giffen is the head of the Statistical Department of the Board of Trade ; but the figures he tendered in his evidence were exceedingly wide of the mark. He also betrayed a tendency to treat the interests of the working-people in the sugar refineries as a matter of small moment. Indeed, his suggestions on this head were denounced at Greenock as those of a “cold-blooded economist.” Provost Campbell expressed the opinion that Mr. Giffen must be a native of one of the agricultural counties of the south, where the labourers are treated as serfs. The worthy chief magistrate of the sugar capital, who seems to be a trenchant as well as an able speaker, also suggested that it might be as well to place Mr. Giffen on the retired pension list. But it is hardly time for that, as Mr. Giffen has only been the statistical head at the Board of Trade for a few years, and still a young man. Instead of being a Southron, he is a native of that old weaving village that lies on the other side of Loudoun Hill. When he left Strathaven, it was to settle as a lawyer’s clerk in Glasgow ; and in that city he became connected with the newspaper press. He had also some training for the work of the journalist on a paper at Stirling—the same print, by the way, which had on its staff at one time the famous war-correspondent of the *Daily News*, Mr. Archibald Forbes. Proceeding to London, Mr. Giffen worked his way up to the sub-editorship of the *Economist*, and also became a contributor to the *Daily News*, the *Saturday Review*, and the *Fortnightly*. For Mr. Goschen he executed a series of statistical tables that were appended to a pamphlet by that gentleman ; and shortly after the Tory Ministry came into office in 1874 he received the Government appointment which he now holds, and the salary attached to which is, we believe, £1200 a year. It is to be hoped that the most of his statistical calculations are more trustworthy than those relating to the sugar trade, which have been shown to be absurdly inaccurate.—*The Kilmarnock Standard*, June 26th, 1880.

THE PRACTICAL DETERMINATION OF THE VALUE OF
THE SUGARS OF COMMERCE.

By HENRY A. MOTT, Jun., Ph.D., E.M.

(Continued from page 362.)

2nd. As the scale on the various instruments made to make saccharometric determinations is seldom correct, it is very important to compare the same with a standard instrument. Two instruments sent to me for verification, although associated with a certificate from Dr. Scheibler as to their accuracy, I found the scale gave 2 per cent. too high a result; and in the other $1\frac{1}{2}$ per cent. too low a result. I found it necessary in each case, after experimenting with the scale, to reject them, and to determine a large number of points (56 in all) on another piece of ivory, and have a new scale made, which can well be imagined a tedious undertaking. The reason why it is not practicable to make a scale by dividing the scale in 100 parts between the point where 0 is registered with pure water, and where 100 is registered with 26.048 grammes or 16.35 grammes of perfectly pure sugar in 100 c.c., is, that the two planes of the "quartz wedge" which move the indicator of the scale are seldom if ever parallel. It is, therefore, best, in making observations, even on the most correct instrument, to set the instrument, that is to say, the scale with a quartz plate in the vicinity where the tests are to be made, instead of setting the instrument correct at 0° , and then working at the other end of the scale in the eighties or nineties.

To determine the accuracy of the various instruments used in Wall Street, I took my quartz plate to each laboratory and had it tested. The test given me varied from 97.2 per cent. to 98.1 per cent., almost one per cent. This I considered very poor testing, as the quartz plate was guaranteed to test 97.6 per cent. The trouble was not in the test, however, but in the fact that very few of the instruments were set correctly.

I therefore asked each of the following chemists to set their

instruments correct, and then examined the quartz plate again. I also examined the same on each of their instruments as follows :—

Dr. Grund found.....	97·6	Dr. Mott found	97·6
Dr. Weichert , ,	97·6	„ „ „	97·6
Dr. Kolischer , ,	97·6	„ „ „	97·6
Dr. Mesenny , ,	97·5	„ „ „	97·4
Mr. Speir , ,	97·5	„ „ „	—
Dr. Harnish , ,	97·7	„ „ „	97·7
Dr. Sherer , ,	97·7	„ „ „	97·7
Dr. Mott , ,	97·6	„ „ „	97·6

From this experiment it will be seen that the difference in the instruments in Wall Street, when they are set correctly, is only 0·2°, which is sufficiently accurate ; but unfortunately they are not always set accurately, as one chemist sent me, as stated above, 97·2 per cent. as representing my quartz plate, while another sent me 98·1 per cent. This shows the necessity of setting the instrument at least once if not twice a day, as an error of 0·9° is perfectly inexcusable.

3rd. If two different observers are to examine a given sugar solution on the same instrument, it is all important that each observer set the instrument at the start with the quartz plate before reading the strength of the solution ; as the eyes of some observers differ materially in reading when the instrument is set for one and not for the other observer.

4th. It has been stated that error may arise by screwing the ends too hard on the glasses of the tube, but there is no foundation for this whatever.

5th. Error often arises from not mixing the sample to be examined carefully. It is best in every case to pound the sugar in an iron mortar, so as to insure there being no lumps.

6th. The weighing need only be carried to one centigramme in delicacy, but it should be as delicate as this.

7th. Error arises from the use of too large a quantity of bone-black, as also from the improper use of small quantities. This point has already been considered in another paper.

8th. The most reliable and satisfactory results are obtained by the use of a concentrated solution of salt (sodium chloride) and triplumbic acetate to decolorize a solution. The addition of too large a quantity is objectionable, as the precipitate formed occupies too much space. For dark sugars 4 c.c. of the salt solution and 6 c.c. of the lead solution will be quite sufficient to give a clear, light-coloured solution when 16.35 grammes of sugar are used instead of 26.048 grammes. To determine the fact that the use of these proportions does not influence the percentage of sugar, I have conducted a number of experiments : 16.35 grammes of granulated sugar was dissolved in water and diluted to 100 c.c. and tested. It gave 99.8 per cent. The same quantity was again weighed out, and the above proportions of salt and lead solution were added. The filtrate from the solution tested exactly the same, 99.8 per cent.

I repeated this experiment with sugars of inferior grades, with identically the same results, which demonstrated that the volume occupied by the precipitate did not influence the result.

9th. Error arises, and serious error, in attempting to read dark-coloured solutions.

It is always best to reject any solution which is even a dark yellow. When it is even the slightest orange colour it is worthless for accurate observations.

10th. Error, I have already stated, arises by taking half the normal weight of sugar and then multiplying the result by two ; this should be avoided as much as possible.

11th. Error often arises in writing down the indications of the instrument, as also reading the same too quickly. It is therefore best, if the method I am about to describe is not adopted, to weigh out the sugar to be tested twice, and prepare two solutions, and test each solution separately, and write down each result separately. It is true this would give twice the work, but it is also true that the test may decide the purchase or sale of thousands of dollars' worth of sugar, and any small mistake in the test would be a loss of hundreds of dollars.

12th. Error arises by adopting the various areometer methods for

the determination of water in sugar. To this subject I have devoted considerable attention, and have made hundreds of comparative results, which have demonstrated the falsity of the indications of areometers. In a large number of sugars which, by more exact processes, showed the presence of $1\frac{1}{2}$ to 2 per cent. of water, showed by the areometer method from 0·5 to 0·7 less than no water at all. It is not reasonable to suppose that the indications of an areometer could be worth anything when applied to a pure sugar, and then claimed to be correct when applied to impure sugars of varying per cent. of soluble impurities, if to the indication there is added some theoretical correction which is not based upon the actual fact of the case, but on supposition.

The following experiment will illustrate the varying processes:—

A centrifugal sugar gave, according to the "water areometer," allowing 1-20th of the impurities as error due to the salts present	—1·89 per cent.
The Balling areometer, allowing $\frac{2}{3}$ correction of temperature, gave	+1·3 per cent.
Scheibler's areometer (corrected) gave	+1·0 per cent.
Drying in air bath gave.....	+2·3 per cent.
Drying over sulphuric acid gave	+2·3 per cent.
Drying in vacuo gave	+2·1 per cent.

Another sugar gave 4·5 per cent. water by drying in air-bath over sulphuric acid and in vacuo, whilst the areometer, according to one method, gave only 0·9 per cent., and by the other 1·5 per cent. water. With a little practice I consider it possible to tell within one per cent. the amount of water in any sample of sugar by feeling the same, and more reliance can be placed in this method than it is possible to place in the areometer method.

There can be no question but that for the rapid determination of water, drying the same in vacuo is the most reliable method. We may now pass to the method which, in my opinion, should be adopted for the determination of the true per cent. of cane sugar in a given sample.

Instead of 26·048 grammes or 16·35 grammes of sugar being taken, ten times the quantity should be weighed, that is 260·48 grammes for the Ventske, and 163·5 grammes for the Laurent or Duboscq instrument; this should be dissolved in water and poured in a flask, graduated to exactly 1000 grammes of water. If the solution is very dark, add 40 c.c. of concentrated salt solution and then 60 c.c. of triplumbic acetate, and then dilute to the 1000 mark. If the sugar is light a much less quantity of decolourizing reagents may be used. Shake the mixture thoroughly and filter about 100 c.c.; put 50 c.c. of this solution in a small graduated flask to be inverted, and test the remaining filtrate directly in the instrument. By taking so large a quantity of sugar we are sure of getting a fair average sample, which is next to impossible in the majority of raw sugars when only 16·35 or 26·048 grammes are taken. This I have demonstrated any number of times by testing the same sugar several times—the difference in some instances amounting to from 0·5 to 0·75 of a per cent. when the greatest possible care is used. I consider it necessary to invert the sugar, as numerous experiments have demonstrated that the other substances present which affect polarized light, and which are supposed to neutralise each other, do not, except in very pure sugars, where they only exist in very small quantities.

The test for cane sugar, as given by the direct test, I find in some cases entirely too high and in others entirely too low.

The process for inversion is very simple. To the 50 c.c. of filtrate in a small flask add 5 c.c. of HCl. (containing 5 per cent. of SnCl_4) and shake thoroughly, then heat in a water bath to 6·8° C. It is best to allow the solution time to cool until its temperature is about 30° C.; it can then be tested in the instrument, noting the temperature. Add this test to the direct test and refer to Clerget's table—follow the column corresponding to the temperature down until the number nearest to the two tests added together is reached. By following then the line horizontally to the column A, the per cent. of sugar is given.

CLERGET'S TABLE.—DEGREES.

By Wgt. A	By vol. B	Cent.	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°
40	65-40	53-6	53-4	53-2	53-	52-8	52-6	52-4	52-2	52-0	51-8	51-6	
41	67-03	54-9	54-7	54-5	54-3	54-1	53-9	53-7	53-5	53-3	53-1	52-9	
42	68-67	56-3	56-1	55-9	55-6	55-4	55-2	55-0	54-8	54-6	54-4	54-2	
43	70-30	57-6	57-4	57-2	57-0	56-8	56-5	56-3	56-1	55-9	55-7	55-5	
44	71-94	59-0	58-7	58-5	58-3	58-1	57-9	57-6	57-4	57-2	57-0	56-8	
45	73-57	60-3	60-1	59-8	59-6	59-4	59-2	58-9	58-7	58-5	58-3	58-0	
46	75-21	61-6	61-4	61-2	60-9	60-7	60-5	60-3	60-0	59-8	59-6	59-3	
47	76-84	63-0	62-7	62-5	62-3	62-0	61-8	61-6	61-3	61-1	60-9	60-6	
48	78-48	64-3	64-1	63-8	63-6	63-4	63-1	62-9	62-6	62-4	62-2	61-9	
49	80-11	65-7	65-4	65-2	64-9	64-7	64-4	64-2	63-9	63-7	63-4	63-2	
50	81-75	67-0	66-7	66-5	66-2	66-0	65-7	65-5	65-2	65-0	64-7	64-5	
51	83-38	68-3	68-1	67-8	67-6	67-3	67-1	66-8	66-5	66-3	66-0	65-8	
52	85-02	69-7	69-4	69-2	68-9	68-6	68-4	68-1	67-9	67-6	67-5	67-1	
53	86-65	71-0	70-7	70-5	70-2	70-0	69-7	69-4	69-2	68-9	68-6	68-4	
54	88-29	72-4	72-1	71-8	71-5	71-3	71-0	70-7	70-5	70-2	69-9	69-7	
55	89-92	73-7	73-4	73-1	72-9	72-6	72-3	72-0	71-8	71-5	71-2	70-9	
56	91-56	75-0	74-8	74-5	74-2	73-9	73-6	73-4	73-1	72-8	72-5	72-2	
57	93-19	76-4	76-1	75-8	75-5	75-2	74-9	74-7	74-4	74-1	73-8	73-5	
58	94-83	77-7	77-4	77-1	76-8	76-6	76-3	76-0	75-7	75-4	75-1	74-8	
59	96-46	79-1	78-8	78-5	78-2	77-9	77-6	77-3	77-0	76-7	76-4	76-1	
60	98-10	80-4	80-1	79-8	79-5	79-2	78-9	78-6	78-3	78-0	77-7	77-4	
61	99-73	81-7	81-4	81-1	80-8	80-5	80-2	79-9	79-6	79-3	79-0	78-7	
62	101-37	83-1	82-8	82-5	82-1	81-8	81-5	81-2	80-9	80-6	80-3	80-0	
63	103-00	84-4	84-1	83-8	83-5	83-2	82-9	82-5	82-2	81-9	81-6	81-3	
64	104-64	85-8	85-4	85-1	84-8	84-5	84-2	83-9	83-5	83-2	82-9	82-6	
65	106-27	87-1	86-8	86-4	86-1	85-8	85-5	85-1	84-8	84-5	84-2	83-8	
66	107-91	88-4	88-1	87-8	87-4	87-1	86-8	86-5	86-1	85-8	85-5	85-1	
67	109-54	89-8	89-4	89-1	88-8	88-4	88-1	87-8	87-4	87-1	86-8	86-4	
68	111-18	91-1	90-8	90-4	90-1	89-8	89-4	89-1	88-7	88-4	88-1	87-7	
69	112-81	92-5	92-1	91-8	91-4	91-1	90-7	90-4	90-0	89-7	89-3	89-0	
70	114-45	93-8	93-4	93-1	92-7	92-4	92-0	91-7	91-3	91-0	90-6	90-3	
71	116-08	95-1	94-8	94-4	94-1	93-7	93-4	93-0	92-6	92-3	91-9	91-6	
72	117-72	96-5	96-1	95-8	95-4	95-0	94-7	94-3	94-0	93-6	93-2	92-9	
73	119-35	97-8	97-4	97-1	96-7	96-4	96-0	95-6	95-3	94-9	94-5	94-2	
74	120-99	99-2	98-8	98-4	98-0	97-7	97-3	96-9	96-6	96-2	95-8	95-5	
75	122-32	100-5	100-1	99-7	99-4	99-0	98-6	98-2	97-9	97-5	97-1	96-7	
76	124-26	101-8	101-5	101-1	100-7	100-3	99-9	99-6	99-2	98-8	98-4	98-0	
77	125-89	103-2	102-8	102-4	102-1	101-6	101-2	100-9	100-5	100-1	99-7	99-3	
78	127-53	104-5	104-1	103-7	103-3	103-0	102-6	102-2	101-8	101-4	101-0	100-6	
79	129-16	105-9	105-5	105-1	104-7	104-7	103-9	103-5	103-1	102-7	102-3	101-9	
80	130-80	107-2	106-8	106-4	106-0	105-6	105-2	104-8	104-4	104-0	103-6	103-2	
81	132-43	108-5	108-1	107-7	107-3	106-9	106-5	106-1	105-7	105-3	104-9	104-6	
82	134-07	109-9	109-5	109-1	108-6	108-2	108-7	108-4	107-0	106-6	106-2	105-9	
83	135-77	111-2	110-8	110-4	110-0	109-6	109-1	108-7	108-3	107-9	107-5	107-2	
84	137-34	112-6	112-1	111-7	111-3	110-9	110-5	110-0	109-6	109-2	108-8	108-5	
85	138-97	113-9	113-5	113-0	112-6	112-2	118-8	111-3	110-9	110-5	110-1	109-7	
86	140-61	115-2	114-8	114-4	113-9	113-5	113-1	112-7	112-2	111-8	111-4	111-0	
87	142-24	116-6	116-1	115-7	115-3	114-8	114-4	114-0	113-5	113-1	112-7	112-3	
88	143-88	117-9	117-5	117-0	116-6	116-2	115-7	115-3	114-8	114-4	114-0	113-6	
89	145-51	119-3	118-8	118-4	117-9	117-5	117-0	116-6	116-1	115-7	115-2	114-9	
90	147-15	120-6	120-1	119-7	119-2	118-8	118-3	117-9	117-4	117-0	116-5	116-2	
91	148-78	121-9	121-5	121-0	120-6	120-1	119-7	119-2	118-7	118-3	117-8	117-5	
92	150-42	123-3	122-8	122-4	121-9	121-4	121-0	120-5	120-1	119-6	119-1	118-8	
93	152-05	124-6	124-1	123-7	123-2	122-8	122-3	121-8	121-4	120-9	120-4	120-1	
94	153-69	126-0	125-5	125-0	124-5	124-1	123-6	123-1	122-7	122-2	121-7	121-4	
95	155-32	127-3	126-8	126-3	125-9	125-4	124-9	124-4	124-0	123-5	123-0	122-6	
96	156-96	128-6	128-2	127-7	127-2	126-7	126-2	125-8	125-3	124-8	124-3	123-9	
97	158-59	130-0	129-5	129-0	128-5	128-0	127-5	127-1	126-6	126-1	125-6	125-2	
98	160-23	131-3	130-8	130-3	129-8	129-4	128-9	128-4	127-9	127-4	126-9	126-5	
99	161-86	132-7	132-2	131-7	131-2	130-7	130-2	129-7	129-2	128-7	128-2	127-8	
100	163-5	134-0	133-5	133-0	132-5	132-0	131-5	131-0	130-5	130-0	129-5	129-0	

Granulated sugar tested 99.9° *direct*.

Inverted, it tested —30°, at 28° C.

$99.9 + 30 = 129.90$ at 28° C.

$129.9 = 99.9$ per cent. sugar ($130.0 = 100$ per cent. at 28° C.)

The following are a number of tests which I made with the utmost care, regarding the 0° of the instrument every time an observation was made :—

Brand of Sugar.	No. Dutch Standard.	Direct	Corrected.	Difference in favour of Corrected, per cent.
Muscovado	11	87.1	88.25	+ 1.15
Molasses	6	84	85.5	+ 1.5
Muscovado	8	84	83.5	- 0.5
Centrifugal	8	93	94.25	+ 1.25
Centrifugal	8	89	89.75	+ 0.75
Molasses	7	84.3	86.6	+ 2.3
Centrifugal	10	95	94.75	- 0.25
Centrifugal	10	94	93.5	- 0.5 *
Centrifugal	7	90.4	89	- 1.4
Centrifugal	7	93	91.5	- 1.5
Centrifugal	7	91	90	- 1.0
Centrifugal	7	91.1	90.4	- 0.7
Guadeloupe	10	87	86.1	- 0.9
Guadeloupe	6	78.5	79.4	+ 0.9
Refined C.	—	86.3	87	+ 0.7
Refined C.	—	85.2	85	- 0.2
Refined syrup	—	39.3	41.6	+ 2.3
Black strap	—	46	46.4	+ 0.4

By examining these tests it will be seen that the difference by inversion is from —1.5 to +2.3 per cent. That is to say, a sugar testing 93 per cent. by the direct test, when inverted only tested 91.5 per cent., owing to the presence of glucose in excess, which turned the plane of polarization in the same direction as cane sugar. Another sugar testing directly only 84.3 per cent., when inverted tested 86.6. This example shows that the true per cent. of cane sugar was prevented from manifesting itself owing to the presence of an excess of laevulose and gum, which turned the plane in the opposite direction.

From these experiments it is clearly shown how necessary it is to invert a sugar before the true per cent. of cane sugar can be obtained.

Having now determined the several factors, let us proceed to the determination of the value.

The following examples will serve to illustrate :

EXAMPLE No. 1.

Brand of sugar	Muscovado.
Sample taken from	25 per cent. of hhd's.
Depth of foot	4 inches.
Condition of cargo.....	Good.
Colour of sugar.....	No. 12 D. S.
Gum	Not excessive.
Corrected per cent. of cane sugar.....	90·00 per cent.
Water	4·00 per cent.
Dry substance	96·00 per cent.
Sugar in dry substance.....	93·75 per cent.

A cargo of raw sugar, such as is described in the above example, was, on the 10th of November, 1879, worth 9 cents per lb.

If all the factors remained the same except the colour, which we will suppose No. 8, instead of No. 12, the sugar would then have lost one-quarter of a cent, and would be worth only $8\frac{3}{4}$ cents—that is to say, for four shades of colour, an allowance must be made of at least one-quarter of a cent.

If all the factors remain the same in the first example, except the per cent. of cane sugar, which we will change to 85 per cent., instead of 90 per cent., the value then will be only $8\frac{1}{8}$, or five-eighths cent. This allows, in Muscovado sugar, one-sixteenth of a cent. for every degree, or per cent.

(To be continued.)

A number of syrup and sugar factories, several of them on a large scale, are preparing for work in Missouri. A great many farmers have planted sorghum, and the sugar industry is being prosecuted with vigour in that State.

PICCARD'S SYSTEM OF UTILIZING THE HEAT
ESCAPING FROM AN EVAPORATING LIQUID.

Communicated by P. O. WHITEHEAD, Old Trafford, Manchester.

In manufactures, such as that of sugar, it is frequently necessary to evaporate a liquid, in order, either to concentrate it, to precipitate from it a solid body held in solution, or to separate from each other two liquids which boil at different temperatures. In most cases, this evaporation is brought about by burning fuel in sufficient quantities to produce the heat necessary to convert the liquid into vapour.

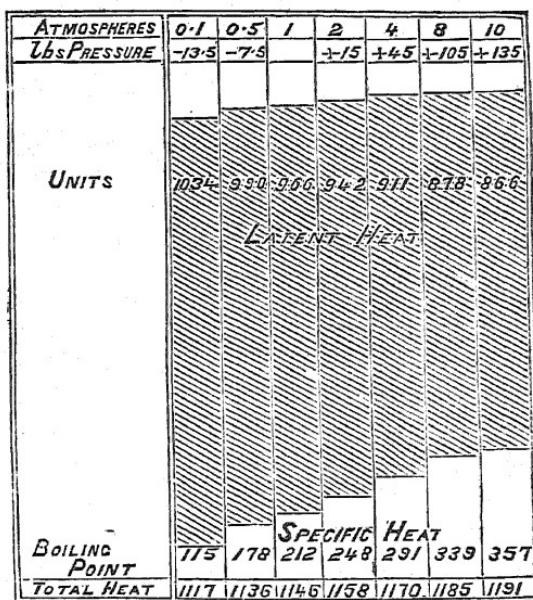
This consumption of fuel generally forms a considerable item in the cost of production.

To evaporate at atmospheric pressure 1 lb. of water, taken at 32° F., we require 1145 calorific units, of which 180 are used in raising it from 32° F. to 212° F. and 965 in converting it from water, at 212° F. into steam at the same temperature.

The former quantity is called *specific heat*, and the latter, *latent heat*. The sum of the two quantities is called the *total heat* of steam at 212° F.

The total heat of steam remains nearly constant, whatever may be the temperature at which evaporation takes place, as will be seen by the diagram, Fig. 1. This diagram also shows that the steam which escapes from a liquid, whatever the temperature of the former may be, carries off with it a considerable amount of heat corresponding to a heavy outlay of fuel, and may be said to form a very costly product, which we must endeavour to turn to account. Its escape into the atmosphere entails considerable loss, which it is often possible to diminish or even to avoid completely.

To utilize steam, as a means of heating, it must be condensed; that is, made to return from a state of vapour to that of liquid. This transformation gives off as much heat as the passing from a liquid to a gaseous state absorbed,



Heat can be collected and transferred to a liquid by putting steam in contact with the sides of the vessel containing the fluid to be heated. Condensation will occur, and the heat be transmitted through the sides of the vessel on condition that the steam be hotter than the fluid within.

One pound of steam can, while condensing and losing its total heat, either heat to 212° F. 6.37 lbs. of liquid, or cause another pound of liquid to evaporate. This latter utilization of the heat of steam, although presenting great difficulties, is one which alone interests manufacturers, as the former cannot be generally applied.

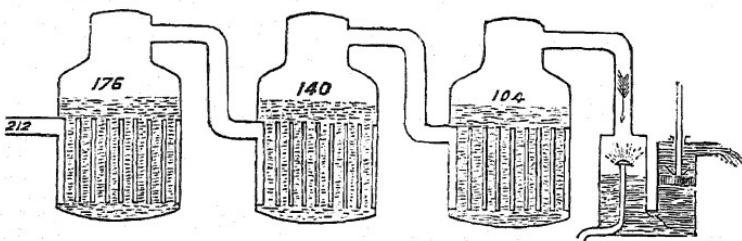
II.

The problem of utilizing steam to cause ebullition in fresh quantities of liquid has been solved in certain industrial apparatus used for distilling as well as in others employed to produce evaporation in sugar manufactories, and known by the name of double, triple, or generally, multiple action machines.

In this apparatus (Fig. 2) the steam produced in the generator is brought into contact with the sides of the first boiler containing

AUG. 2, 1880.

the fluid to be evaporated, and, in condensing, transmits its latent heat to this fluid, which then begins to boil.



The steam given off by this fluid is in turn brought into contact with the sides of a second boiler where it condenses and gives up its heat as before. The operation is repeated at a third boiler, where ebullition is again produced.

We stated above, that steam cannot be condensed against the sides of a vessel unless its temperature is higher than that of the liquid to be heated. This condition is fulfilled in the triple action machines by means of a condenser into which cold water is injected, and by an air pump which continually sucks up the steam escaping from the third boiler while passing through the condenser, and, in this way, maintains in the boiler a vacuum as complete as possible. The lowering of the pressure in the last boiler allows the liquid it contains to boil at a low temperature, consequently the steam of the second boiler, in which the liquid boils at a temperature somewhat higher, condenses by contact with its sides. Again, the vacuum produced in the second boiler is less complete than in the third, but sufficient to lower the boiling point of the fluid it contains, so that the steam of the first boiler will condense on coming in contact with its sides.

By this process, the steam generated in each boiler condenses against the sides of the following one, causing its contents to boil. The difference of temperature necessary to produce this result is obtained by carrying the steam issuing from each boiler to the sides of the next, which contains a cooler liquid, whose boiling point is lowered by successively weaker pressures.

This difference of temperature secures the transmission of heat

through the sides of the boilers. The amount transmitted being in proportion : 1st. to the difference of temperature between the steam and the liquid, and, 2nd. to the extent of the transmitting surface.

In observing the operations of multiple action machines, we remark that the difference of temperature between the steam brought in contact with the first boiler, and that given off by the last, is the sum of the respective differences of the heat to the transmitting or condensing surfaces. We might obtain a great number of gradations and consequently successive reproductions of the heat contained in steam by employing very large condensing surfaces which would permit the transmission of a large amount of heat with but small variation of temperature, and by causing the first boiler to be in ebullition, at the outset, by means of highly heated steam.

Suppose we heat the first boiler by means of steam under a pressure of 8 atmospheres, or at 338° F., and, by working the condenser and air pump, maintain ebullition in the last boiler at 104° F. If, in addition to this, the condensing surfaces are large enough to transmit, with a difference of 27° F., all the heat, we shall be able to operate one after another $338 - 104 \div 27 = 8.66$, or in round numbers 8 boilers, and thus evaporate, with the same amount of fuel, a quantity of water 8 times greater than if heated directly by fire.

From this example it would appear that the utility of multiple apparatus might be extended almost indefinitely; practically, however, its useful action is very limited. An 8 successive action apparatus, for instance, would present numerous inconveniences; a few of which we will point out.

1st. The fluid to be evaporated must be subjected, in the first boilers, to very high temperatures beginning with 338° F. which in most cases are inadmissible.

2nd. The first boilers would undergo pressure of 8, 5.25 and 3.5 atmospheres, which would entail immense outlay in their construction.

3rd. An apparatus with 8 boilers, each working with a different temperature and pressure, would be altogether unmanageable.

In practice we are limited, on the one hand, by the highest temperature to which the liquid can be exposed without risk of decomposition, and, on the other, by the temperature it is possible to maintain in the condenser. Between these two limits we can employ two or, at most, three boilers, forming double or triple action apparatus.

III.

The problem of the recovery of the latent heat of steam admits of a much more general solution than the one we have just discussed. The compression of steam, escaping from a fluid, furnishes a convenient means of raising its temperature, and thus conferring on it the property of condensing against the sides of the very vessel which generated it. This solution, dimly seen at different epochs, has not, as yet, made its way extensively in the industrial arts. Our aim is to prove that it yields remarkable results of the greatest importance to manufactures involving evaporation. It enables us, in fact, to evaporate fluids on a large scale with a very considerable saving of fuel when the motive power necessary for compression has to be supplied by steam, and to do away with it altogether when water power can be employed.

The following is the principle on which the solution is based:—

When saturated steam is compressed, without loss of heat, the pressure of the steam itself increases and its temperature rises at the same time. We may admit, with an approximation sufficient for all practical purposes, that steam follows Mariotte's law, and remains constantly saturated. In reality, the effect of compression is to slightly overheat the steam, so that its temperature afterwards is actually higher than that given in tables as corresponding to the new pressure to which it has been brought.

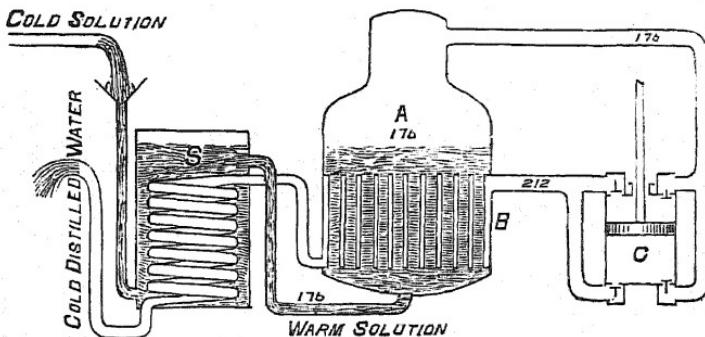
IV.

When the motive power employed to produce compression is supplied by water, the problem of evaporation of considerable quantities of fluid, *without any expenditure of fuel*, can be solved in a practical manner.

The motive power is used to work a steam pump or compressor, by means of which the steam escaping from the liquid to be evapo-

rated is sucked up and compressed, and its temperature thus raised; it is then sufficient to bring it in contact with the sides of the boiler which generated it in order to condense it entirely, as the boiler is still at the temperature of the liquid contained in it, while the steam has assumed a higher one through compression. In this way all the latent heat absorbed by the steam while forming is restored to the liquid.

The steam, when condensed, is in the condition of hot water whose specific heat must also be recovered. For this purpose, the hot distilled water is made to heat the cold fluid destined to feed the boiler by means of a worm or heating tube with inverse current. The specific heat of the distilled water is thus restored to the apparatus.



The following example will, perhaps, make the working of the apparatus more comprehensible. In Fig. 3, A represents a tubular boiler, like those used in sugar works to concentrate the juice; while B is the intertubular space. Suppose the boiler filled to the proper level with the fluid to be evaporated, previously heated to the temperature at which we wish to cause ebullition, say 176° F. The pressure to which it will be subjected will correspond to this temperature, that is 0.5 , or half an atmosphere.

This steam, after being sucked up at 176° F. and put under a pressure of 1 atmosphere, by means of the pump or compressor C, will be driven into the intertubular space, B. Possessing a temperature corresponding to the pressure of 1 atmosphere, that is 212° F., it will condense against the tubes containing the liquid at

176° F. and its latent heat being set free, will in this way, be restored to the boiling liquid.

The distilled water, forming in the space B, would flow off at about 176° F., but before doing so it would be made to pass into the heating tank S, where it will give up most of its remaining heat to the cold liquid destined to feed the boiler.

All the latent heat of the steam being reproduced in the inter-tubular space B, and the specific heat restored to the fluid to be evaporated by means of the heating tank S, no other loss of caloric occurs, than that which results from radiation. It is easy to see that this loss may be reduced to a minimum by enveloping the apparatus in some bad conducting substance, and maintaining the surrounding temperature at a suitable point.

We have already said that the boiler was to be filled with liquid previously heated to the boiling point. This heat having been once communicated the apparatus keeps up its own temperature, as the liquid, destined to feed it, assumes, in the heating tank S, nearly the same temperature as the distilled water, which is itself at the boiling point.

The amount of heat supplied to the apparatus, at starting, circulates uninterruptedly from the boiler to the compressor, and from the compressor to the boiler; forming, continually, new steam from the liquid to be evaporated, which shows what at first sight appears a paradox, that a limited amount of heat, can serve to evaporate an unlimited quantity of fluid.

This system must not be confounded with any of the different methods proposed up to the present time for converting motive power directly into heat, which both theory and experiment have condemned.

This method simply employs motive power to utilize the large amount of heat which the steam would carry away if allowed to escape.

It is true, the mechanical work expended is converted into heat, but this source supplies only a very small fraction of that which is placed at our disposal. In fact, each pound of steam sucked up by the compressor contains a total amount of heat equal to 989 calorific

units, while the mechanical work necessary to compress it from 0.5 to 1 atmosphere furnishes only 47 calorific units. Fig. 4 will serve to show the proportion that one bears to the other.



989 HEAT UNITS.

The steam coming from the compressor being slightly superheated, contains $989 + 47$ or 1036 calorific units, which is restored to the liquid by condensation. Each pound of steam, which leaves the boiler carrying away 989 calorific units, returns with 1036.

In compressing the steam we add but a slight quantity of heat borrowed from mechanical work. It is easy to see, by comparing the above figures, that the object of compression is to restore the 989 calorific units to the liquid, rather than gain the 47 units on each pound of steam operated upon.

Nevertheless, the trifling amount of heat obtained from motive power is important, as it allows us to counterbalance the inevitable waste of heat in an industrial apparatus.

If the heat proceeding from the transformation of work exceeded the waste, the temperature of the apparatus would continue to rise. It would then only be necessary to let out a little steam by means of a safety valve placed in the delivery pipe to prevent variation.

If, on the contrary, the losses of heat were not compensated for by the transformation of the mechanical work, it would be necessary to heat the apparatus slightly from time to time by means of a little fuel, to compensate for the difference between the loss and gain.

It would be easy, in either case, to keep up a constant temperature in the apparatus, so we shall have nothing to correct, in this connection, but variations both unimportant and slow to manifest themselves.

The pressure and temperature in the boiler A, being thus maintained at the same point, it is clear that we can always have, in the intertubular space B, a fixed pressure of 1 atmosphere. To obtain this, we have only to calculate the tubular condensing

surface according to the difference of temperature we wish to maintain, and give the compressor a suitable speed.

To enable the reader to estimate more fully the value of this system, we will give a few particulars about the motive power employed and the evaporating force.

If we understand, by fall of temperature, the difference between that of the compressed steam in the space B, and the liquid to be evaporated in the boiler A, we find, in accordance with known physical laws, that the quantity of heat given off by the sides of the tubes is proportional :—

1st. To the fall of temperature with which we operate.

2nd. To the heating surface employed.

Now, the amount of liquid which is evaporated, being itself proportional to the amount of heat restored to it, it follows that it must be proportional both to the fall of temperature and to the surface of the tubes.

To produce a given evaporation per hour, we may either employ a small tubular surface and a great fall of temperature, or a large tubular surface and small fall of temperature ; but the greater the fall of temperature required, the more steam must be compressed and the greater the power expended.

Hence the necessary horse power to produce a given evaporation must be increased in the same proportion that the tubular surface is diminished. We may then expend as little force as we please, but the less force expended the greater must be the condensing surface of the boiler and the increase of cost.

Whatever may be the temperature of the steam when sucked up, it requires the same amount of force to produce, in a given quantity, an equal increase of temperature by compression, *so that the evaporation of a liquid, by this system, can take place at a low temperature as well as a high one.* In the example chosen above, the supposed difference of 36° F. might have been taken at any point of the thermometrical scale; as, for instance, between 104° F. and 140° F., 176° F. and 212° F., 302° F., and 338° F., &c., without expending more motive power in one case than in the other.

(To be continued.)

Correspondence.

BONNEFIN'S FILTER-PRESS.*

Glasgow, July, 1880.

To THE EDITOR OF "THE SUGAR CANE."

Dear Sir,

I have read the articles or letters on Mr. Bonnefin's Filter, in the *Sugar Cane*. The facts stated cannot convey a correct idea of the merits of Mr. Bonnefin's Filter, as some of the most important details are wanting, in order to compare the results with those obtained by other existing modes of filtration.

The quantity of filtered liquor, although your correspondents on the matter consider it very extraordinary, I, for my part and from practical experience, must term very small, taking any other ordinary-sized filter-press, say with about 200 square feet of filtering surface, and the liquor at 28·29° Beaumé.

Perhaps your correspondents will, in the interests of all your readers, have the kindness to give some fuller details in your next issue, and answer the following questions, after which every sugar refiner will be enabled to judge for himself of the merits of this filter:—

1st.—Are these filters in actual use and how long, or have they been put aside after the trials; state also filtering surface of each filter-press?

2nd.—Quantity of filtered liquor in, say, 10 or 12 hours, of what density, and at what temperature?

3rd.—Time of each filtration, also amount of filtered liquor each filtration?

4th.—How many filtrations could conveniently be made in 10 or 12 hours with each press, and how often, if ever, was the filter cloth changed?

* Mr. Bonnefin, the inventor of the processes which bear his name, was the contributor of the extracts from M. Poculot's letter which appeared in our last issue, and the few introductory lines should have borne his signature—omitted, we regret to say, by oversight.—ED.

5th.—Were the cakes washed in the press, *i.e.*, was the sugar liquor all extracted; if so, what quantity of "weak liquor," and at what density obtained at each pressing?

6th.—Weight of cakes each pressing?

7th.—Was the washing or lixiviating of the cakes done by steam or water?

8th.—Was proper analysis taken of the liquor before and after filtration?

At the same time, I would ask Mr. Bonnefin to make trials once again in Great Britain, in a refinery, on different classes of sugar, and thereafter publish the results in full, as per my questions, which would settle the matter right off. If Mr. Bonnefin's capillary filter had proved a success against the present Taylor-filters a few years ago, when many experiments were made with the same, I am sure every refinery in Great Britain would have adopted them, whereas not a single press of Mr. Bonnefin's is in use in the refineries of Great Britain. On the continent of Europe the Bonnefin and other *capillary* filter-presses must have been most unsuccessful against ordinary filter-presses, or else the capillary filters would have been adopted there very largely; but as far as I can learn, there is not one of the various capillary filters in use there.

Hoping Mr. Bonnefin, and others interested, will have the kindness and reply fully in your next issue,

I am, Sir, yours truly,

B. H. REMMERS.

The experience gained by the French Office of Woods and Forests with regard to the acclimatisation of foreign, especially trans-oceanic forest trees, is particularly valuable. The blue gum-tree imported from Australia prospers in the South of France, and by its plantation at the mouth of the Var, the marshes surrounding it have been drained, and the fevers formerly prevailing there banished. The trees prosper wonderfully in Algiers, as the section of a trunk not yet fifteen years old, of a diameter of one foot, proves.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

2589. ANDREW STEWART, Sugar Refiner, and Adam Hunter, Engineer, of Greenock, Renfrewshire, North Britain. *A new or improved construction of machinery or apparatus to be employed in packing sugar, or other powdered, granular, or broken material, in casks or other vessels.*

2631. WILLIAM HENRY HODGE and ARTHUR BRYANT HODGE, Sugar Refiners, and JOHN JOSEPH EASTICK, of Fieldgate Street, Middlesex. *An improved process or method of decomposing organic or inorganic substances, chiefly designed for the manufacture of sugar and for the treatment of various bodies or compounds, to eliminate the salts, acids, or bases contained therein, and to obtain new products or compounds.*

2718. GEORGE BUCHANAN and WILLIAM ALEXANDER KEAY, of 25, Bucklersbury, London, Engineers. *Improvements in sugar-cane crushing machinery.*

2719. CHARLES GEORGE PFANDER, of St. Andrew's Hill, Queen Victoria Street, London. *Improvements in the preparation of materials for clarifying sugar, oils, and other liquids.*

2779. DUGALD MAC EACHRAN, of Greenock, Renfrewshire, North Britain, Sugar Refiner. *Improvements in separating iron from animal charcoal, sugar, and saccharine liquids, and in the means or apparatus employed therefor.*

2902. BERNHARD HEINRICH REMMERS and JOHN WILLIAMSON, both of Glasgow, Lanarkshire, North Britain. *Improvements in, and connected with, the refining or purifying of sugar, saccharine matter, and oils.*

ABRIDGMENTS.

4761. DUGALD MAC EACHRAN, of Greenock, Renfrewshire, North Britain, Sugar Refiner. *Improvements in the manufacture of sugar and saccharine syrups and in the apparatus to be employed therein.* This invention relates to various means of cooling the sugar in a liquid, semi-liquid, dry, or other state. Sugar, in a liquid or semi-liquid state, is caused to pass along an inclined step (forming a helical trough). This incline is fitted in a double casing, and this jacket is filled with water, or other cooling medium. The bottom of the trough may also be hollow, and cooling liquid passed through the same as the fluid to be cooled flows over it. Such a helical trough may be arranged over a jacketed cooling vessel which is provided with revolving scrapers, the arms and shaft of which are all hollow to admit a cooling medium. The inventor also supplies cold air to the centrifugal machine, both in the rotating basket and between it and the stationary casing of the

machine; and into the latter part a coiled pipe may be fixed, through which is passed any cooling fluid. The sugar from the centrifugal machine may be cooled by being caused to fall on to a travelling web, over which currents of air are blown, and beneath which cold air may be supplied from perforated pipes; and the rollers over which the web passes may be filled with cooling fluid. The cooling of sugar at this stage may also be effected by being spread in thin layers upon the floor, and cold air passed over it. In this case, if the current of air is created by fans, the latter may be so placed as to turn over the sugar as they revolve.

4795. JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, Middlesex. *Improvements in, or connected with, centrifugal machines employed in the manufacture of sugar.* (A communication from Albert Fesca, of Berlin, Germany.) This invention relates to centrifugal machines for draining sugar loaves. In order to prevent unequal distribution of weight in the basket, a proper receptacle or casing is provided for each sugar mould, which fits exactly therein; and these receptacles are equally distributed in the basket and fixed therein. To facilitate the placing of the moulds into the machine, a long lever is provided, capable of swinging horizontally and vertically. One end of this lever is provided with a handle, and the other end with a swinging holder for the mould. The first position of this lever is with holder resting on a table, where the mould is placed in it, the lever being held in position between two guides, from which it is then lifted and swung round horizontally until it comes between two other vertical guides which enable it to be lowered into the basket at the exact point required. By the reverse action of this lever, the moulds may be removed from the basket.

4831. JOHN HENRY JOHNSON, of 47, Lincoln's Inn Fields, Middlesex. *Improvements in the preparation and treatment of saccharine substances and compounds, and in the apparatus employed therin.* (A communication from Moriz Weinrich, of Vienna, Austria.) The invention consists firstly of a process of mixing pulverized hydrate of lime and milk of lime with heated molasses, in order to obtain hard, dry, brittle melassate of lime without artificial drying; and also a process of mixing milk of lime with concentrated and heated molasses for the same purpose. The mixing apparatus consists of a cylindrical chamber with a false bottom and double sides, by means of which it is capable of being thoroughly heated by steam. This chamber is provided with suitable continuously revolving stirrers; and the milk or hydrate of lime is admitted through an orifice on one side of the chamber, and the heated molasses through an orifice on the opposite side of the same. The mixture is discharged through a valve at the bottom of the apparatus and led into boxes, where it becomes consolidated into hard, dry, brittle masses. These masses are then passed through a breaking apparatus, to reduce them to a sand (without powdering them.) This apparatus consists of two sets of revolving toothed rollers, the teeth of the upper pair of rollers

being coarser and less closely arranged than those of the under pair. This sandy melassate of lime is then passed into an elutor, which consists of a cylinder horizontally placed, provided at the top with inlets for the melassate of lime and for alcohol, and also with an outlet for the escape of the alcohol when distilled off by the action of steam from perforated pipes within the apparatus. The melassate of lime falls on to a perforated metal plate in the cylinder, which plate is covered with filtering cloth—the above steam pipes being arranged just above this false bottom.

5066. JAMES NAISMITH TODD, of Glasgow, Lanarkshire, North Britain. *Improvements in packing sugar or other granular or pulverulent substances, and in apparatus therefor.* The inventor directs a quantity of sugar into the hogshead to be filled, and then causes a tapered or wedge-shaped plunger to descend therein and press the sugar against the sides; more sugar is fed in, and the plunger again descends. This is repeated until the hogshead is filled or nearly so. The inventor sometimes employs centrifugal force to pack the sugar. The casks being placed vertically on a revolving plate, as the sugar is filled in the centrifugal force throws it outwards against the sides. The centre is packed by the wedging process. In packing small packages they are arranged in a centrifugal basket, with their openings towards the centre, from which the sugar is fed in any convenient manner as the basket revolves, and the centrifugal force packs the sugar tightly. (This invention received provisional protection only.)

5129. ALFRED FRYER, of Wilmslow, Cheshire. *Improvements in apparatus used in the manufacture of sugar, partly applicable to other purposes.* This invention consists firstly in combining, with a "battery" or "tray," an evaporating cylinder, receiving on its outer surface the saccharine juice to be evaporated, and heated internally by the products of combustion which have served to heat the said "battery." Secondly, in constructing furnace bars of a series of wedge-shaped wrought-iron fire bars riveted together; and, lastly, in supporting the casing of a centrifugal machine upon spherical balls interposed between concave surfaces (or oblate spheroidal balls between plane surfaces) upon the casing and upon its foundation, in order to prevent the said foundations from being shaken by the revolving of the machine.

1260 (A.D. 1880). WILLIAM ROBERT LAKE, of Southampton Buildings, London. *Improvements in centrifugal machines for the separation of liquid from solid matter.* (A communication from S. S. Hepworth, of Yonkers, New York, U.S.A.) The chief object of these improvements is to prevent the jarring of the machine when in revolution, and to provide a better valve for discharging the sugar through the bottom of the basket, and better means for operating the same than have hitherto been employed. The different arrangements to obtain these results have been previously described among the American patents in former numbers. These patents are in the names of S. S. Hepworth (Nos. 217689, 218441, and 225600), and T. H. Muller,

assignor to S. S. Hepworth, and another (225631.) The last two were described in May, 1880; the others in September and October, 1879.

AUSTRIAN.

(Patents issued during February, 1880.)

472. P. CALLIBURGÉS, of Constantinople. *A pneumatic condenser for liquids.*

GERMAN.

10287. C. HERBST, of Kuttenberg. *A beet cutter.*

10379. A. L. G. DEHNE, of Halle-on-the-Saale. *Locking filter-presses.*

AMERICAN.

229728. FREDERICK B. McCREA, of Ealing, and EDWARD A. COWPER, of Westminster, England. *Apparatus for chopping sugar into lumps.* This apparatus consists of two sets of knives having chisel-edges arranged in squares, so as to reciprocate, and in advancing towards each other, to cut or chop a slab of sugar placed between them into lumps. To prevent a crushing effect on the sugar, the knives are made capable of a slight lateral motion in each direction, so that while they act as wedges, separating the sugar into pieces, these pieces are also free to move sideways apart from each other. After the sugar is thus divided, the knives retire between a number of guiding bars, leaving the lumps of sugar free to fall or be discharged into a suitable receptacle.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To JULY 17TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	96 ..	83	192 ..	199	170 ..	162
Liverpool ..	49 ..	67	136 ..	172	130 ..	129
Bristol	5 ..	8	32 ..	37	29 ..	30
Clyde	65 ..	76	164 ..	180	132 ..	136
Total ..	215	234	524	588	461	457
Decrease..	19		Decrease..	64	Increase..	4

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST JUNE, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepôts.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
186	104	27	37	4	358	369	356

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST JUNE, IN THOUSANDS OF TONS.

Great Britain.	France	Holland	Germany (Zollverein)	Five other entrepôts.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
954	312	27	294	190	1777	1811	1665

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	275,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	375,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	55,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total.....	1,365,000	1,574,153	1,420,827	1,101,141

STATE AND PROSPECTS OF THE SUGAR MARKET.

The demand for refined sugar experienced at the end of last month has continued, and both "pieces" and stoved goods have advanced in price.

The margin between the price of raw and refined which has now been established, being more satisfactory to the refiners' than for some time past, they have been ready buyers of useful qualities of raw.

A good business has been done, and prices, both of refining and grocery sugars, have ruled in favour of sellers. Low sorts still remain neglected.

The imports in 1880, compared with those of 1879, show a decrease of 64,000 tons, against a decrease of 37,200 tons shown last month.

The deliveries which last month showed an increase of 6,200 tons, now exceed those of 1879 by 3,800 tons.

The stocks of sugar on 17th July, were 19,300 tons less than those of the same date last year, and 63,000 tons more than on the 1st January, 1880.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 23s. 6d., to 24s. 0d., against 22s. 6d. to 23s. 6d.; good to fine grocery, 24s. 6d. to 26s. 6d., against 23s. 6d. to 25s. 6d.; Martinique crystals, 27s. to 28s., against 26s. 6d. to 27s. 6d.; No. 12 Havana, 25s. 6d. to 26s., against 25s. to 25s. 6d.; fair to good refining Cuba Muscovados, 23s. 6d. to 24s., against 23s. to 23s. 6d.; middling to good brown Bahia, 20s. to 20s. 6d., against 20s. to 20s. 6d.; good to fine Pernambuco, 20s. 6d. to 21s. 6d., against 20s. 6d. to 21s.; Paris loaves, 30s. 6d. to 31s., against 28s. to 28s. 6d.

THE SUGAR CANE.

No. 134.

SEPTEMBER 1, 1880.

VOL. XII.

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REPORT OF THE SELECT COMMITTEE ON SUGAR INDUSTRIES.

It is so essential that the Report of the Select Committee should have the widest possible circulation, and that so important a document should not be curtailed, that we give it to our readers *in extenso*. It is a remarkably full, clear, and yet concise statement of the results of the enquiry, and gives, in fact, in the smallest possible compass, an abstract of the five hundred pages of evidence. It is impossible, however, to give the whole report in one number of the *Sugar Cane*. As the steps proposed and conclusions arrived at by the Committee have been anxiously awaited they are given in the present number, the remainder of the report being reserved for our next issue. A separate reprint of the entire report will be forwarded with the October number of the *Sugar Cane* to any subscriber who may apply for it. It commences with a history of the negotiations, and then gives an account of the nature and amount of the export bounty in each country. The effect of the bounties on the home and colonial industries is then described. With these few preliminary observations we now proceed with

THE REPORT.

The Select Committee who were appointed to inquire into the effects produced upon the Home and Colonial Sugar Industries of this Country by the systems of Taxation, Drawbacks, and Bounties, on the Exportation of Sugar now in force in various Foreign Countries; and to report what steps, if any, it is desirable to take in order to obtain redress for any evils that may be found to exist;—Have agreed to the following Report:—

The drawbacks and bounties on the export of refined sugar formed the subject of negotiations so far back as 1862, at which time it does not appear to have been disputed by France, Belgium, and Holland that their drawbacks were so calculated as to include a considerable bounty on exportation, but each Government declared itself unable to abolish these bounties, so long as they were given by the other exporting countries.

With a view of arriving at an international agreement to secure the suppression of the bounties, a proposition was, in December, 1862, made to Her Majesty's Government by the French Government that a Conference should be held on the subject between France, Holland, Belgium, and England; this was assented to, and Conferences were accordingly held in 1863 and 1864 at Paris and London, and the Convention of the 8th of November, 1864, agreed to.

The object sought to be attained by this Convention was the suppression of bounties on the export of refined sugar, by determining the exact per-cent of refined sugar that can be obtained from the various classes of raw sugar used in the process of refining, so that the drawback on exportation should be so fixed as to represent only the amount of duty paid.

The mode by which this was proposed to be secured by the Convention of 1864 was the division of raw sugar into four classes, each class consisting of several qualities having distinctive numbers, according to the Dutch standards of colour. The yield of refined sugar to be obtained from each class was fixed provisionally, but the Convention provided that steps were to be taken immediately, by means of practical experiments to determine the real yields, which would then supersede the provisional yields.

The contracting Powers engaged to establish their duties and drawbacks on this system, and they further undertook to establish an exact correlation between their duties and the yields. Subject to this correlation, each Power was free to fix its own rate of duties. They further agreed to the insertion of an article in the Convention directed against countries which continued to give bounties on the export of refined sugar, as follows: "The high contracting Powers

"reserve to themselves to agree as to the steps to be taken for
 "obtaining the adhesion of the Governments of other countries to
 "the arrangements of the present Convention. In the event of
 "bounties being granted in the said countries on the exportation
 "of refined sugar, the high contracting parties will be at liberty
 "to come to an understanding as to the surtax to be imposed on
 "the importation of refined sugars of and from the said countries."

The experiments provided for in the Convention took place at Cologne in 1866, and a declaration was signed at Paris on the 20th of November, 1866, substituting the following yields as determined by the experiments for the provisional yields of the Convention.

MINIMUM OF THE YIELD OF SUGARS IN THE PROCESS OF REFINING
 PER 100 KILOS. OF RAW SUGAR.

Number of the Series of Dutch Standards.	As regulated provisionally by the Convention.	As fixed after the Cologne Experiments by the Declaration of 20th November, 1866.
18		
17		
16		
15		
14		
13		
12	85 kilos.	88 kilos.
11		
10		
9		
8	81 kilos.	80 kilos.
7		
Below 7	76 kilos.	67 kilos.

While the Convention of 1864 undoubtedly effected a great improvement in the system of fixing the drawbacks, and so materially reduced the bounty previously obtained, it was not calculated

to prove a complete settlement of the question. The principle of assessment according to colour is in itself objectionable, as likely to lead to artificial colouring; and the process adopted at Cologne for estimating the yields seems to have been very defective. Each number in the series represents a certain shade of colour, but sugars of different origins have different strengths, although of the same colour. For the purpose of testing the yield of each number, sugars of different origins but of the same colour were mixed together. This process, it is evident, gave an advantage to some kinds of sugar, and placed other kinds at a disadvantage. By using, therefore, those kinds of sugar which gave the largest yield, such as beetroot and Java sugars, the refiner obtained a larger per centage of refined sugar than the legal yield.

Further, as each class embraced in it several numbers, each number signifying a different strength, it necessarily followed that by using the higher numbers in each class, even if the sugars were correctly assessed in every respect, the refiners would obtain a larger yield than the average yield fixed by the experiment, and so obtain a bounty.

But, unsatisfactory as the Convention was calculated to be as a means of effectually abolishing bounties, it was rendered still more so from the fact that France did not proceed, as the other countries did, to carry out that most essential part of the Convention which provided for the establishment of a correlation between duties and yields, and the French refiners were thus enabled to use large quantities of sugar at a lower rate of duty than they would otherwise have had to pay.

This failure on the part of France to carry into effect the provisions of the Convention formed the subject of much complaint on the part of the refiners of this country, and remonstrances on the subject were addressed to the French Government by the British Government, and although at first the French Government contended that they were not bound to establish correlation, they ultimately abandoned that position, and at a Conference held in 1868 a compromise was agreed to under which correlation in France was postponed until the 31st December, 1869, when it was

definitely to be put into operation. This period was, however, at a subsequent Conference in 1869, still further extended to the 30th of June, 1871, in which year the French Government introduced a Bill into the Assembly, professing to carry out the establishment of correlation, but it was opposed by both the sugar *fabricants* of France and the sugar refiners of this country, because it stopped short of establishing a correlation exactly at the point in the scale where correlation was most essential, and because it proposed to perpetuate the system of assessment by colour, established under the Convention of 1864, which further investigation had proved to be untrustworthy as a means of estimating the real yield of sugar, especially in the case of beetroot sugar, the consumption of which was largely increasing.

This Bill was in 1872 referred to the Superior Council of Commerce, and by it to the Commission of Inquiry, which, after taking a considerable amount of evidence, reported in favour of preserving the system of types, the establishment of an exact correlation between the types and the yield in refined sugar, the maintenance of the existing classes, but with a power to alter the classification, and the employment of analysis in cases where the richness of the sugar appeared to exceed that indicated by its colour.

The Superior Council of Commerce, however, while approving of the modifications proposed by the Commission, expressed their preference for the excise supervision of refineries, by which means duty would only be levied on sugar for home consumption, as insuring more certainly a just distribution of the taxes upon sugar, and its exact assessment.

At this time the British sugar refiners made further strong representations to the Government, a considerable increase of the French duty having greatly aggravated their position, and they urged that the only system which would effectually abolish bounties was the establishment of refining in bond, and expressed their willingness themselves to come under this system, and if necessary to pay any cost of applying it.

Her Majesty's Government thereupon invited the three Powers, parties to the Convention of 1864, to join them in a further Con-

ference in August, 1872, at which the English delegates proposed refining in bond as "the only course by which the inequalities and "bounties can be got rid of." This was, however, opposed by the French delegates, notwithstanding the recommendation of the Superior Council of Commerce, and also by the delegates from Belgium and Holland. It was admitted that the existing system of classification was unsatisfactory, and a counter proposition was brought forward by the delegates of France, Belgium, and Holland, but as in the opinion of the English delegates it was "quite "insufficient for the attainment of the end in view," and had "for its object only certain insignificant alterations of detail," they declined to accept it.

The Conference separated without having arrived at any agreement except to invite their respective Governments to cause the question to be inquired into with the object of finding whether science could supply any more rapid and practical process than that of the saccharometer for the correction of the imperfect system of standards, the delegates from Holland having stated that they would not refuse to consider the system of refining in bond if no other could be found which would establish a correct assessment of duty.

A further Conference of the four Powers was held at Paris in April, 1873, when the delegates from France, Belgium, and Holland recommended the adoption of the saccharimetric test, the delegates from Holland at the same time repeating that refining in bond would be accepted if every other plan were rejected. The delegates from Great Britain while instructed to propose refining in bond were authorised to sign the Report of the Conference if it were confined to improvements in the method of testing sugar which commended themselves to their judgment, provided that it contained nothing condemnatory of the system of refining in bond.

The delegates being unable to agree on refining in bond, agreed on a report recommending recourse to saccharimetry in order to test yields when the actual yields did not appear to correspond with the colour; that the yield in the Belgian system should be augmented, and that France should at once establish a correlation between the duties on sugars and the yields fixed for exportation.

Her Majesty's Government, however, refused their assent to the recommendations of the Conference, and they likewise declined to send delegates to a further Conference proposed to be held at Brussels in February, 1874.

In the meantime the French Government pushed forward their Bill of 1871, and in December, 1872, and February, 1873, further debates took place in the Assembly on the presentation of the Report of the Parliamentary Sugar Commission to which the Bill had been referred, and an amendment in it was proposed by M. Pouyer Quertier, a former Minister of Finance, to the effect that after the 1st of April, 1873, the refiners should be subject to supervision. This amendment was referred to the Sugar Commission, which ultimately reported in its favour on the 21st February, 1873, and, eventually, in March, 1874, the Assembly, by a large majority, adopted it, the date on which the system should come into operation being fixed not later than the 1st July, 1875, the date of the expiry of the Convention of 1864.

The postponement, until July, 1875, of the adoption of the system of refining in bond in France, led to representations from the British sugar refiners to Her Majesty's Government that they should press the French Government either to put in force the system of refining in bond at once, or take steps to carry out the Convention of 1864. The subject was dealt with by the Mixed Commission under the Treaty of 23rd July, 1873; and in answer to representations made by Lord Lyons the obligations of the French Government to establish refining in bond were fully admitted, and the delay attributed to the necessity of framing the regulations for putting that system into operation.

In March, 1875, these regulations were communicated by the French Government to the other Powers with a recommendation from the *Conseil Supérieur du Commerce*, which prepared them, that if the other Powers would not also adopt refining in bond, the National Assembly should be asked to reconsider their vote establishing refining in bond in France.

A Conference therefore took place in Brussels, in May, 1875, with the result that in August, 1875, a Convention was agreed to

establishing refining in bond in France and Holland, and stipulating for certain improvements in the existing system in Belgium, coupled with a reduction in the duty. Meanwhile, on the motion of the French Government, the Assembly in July passed a law postponing the date on which the previous law establishing refining in bond in France was to come into operation till March, 1876, and providing temporarily for an alteration in the mode of analysis; and again in December, 1875, in view of a possible non-ratification of the Convention of August, the French Assembly passed a further law providing for a system of saccharimetric analysis, to come into operation on the 1st March, 1876, as a substitute for refining in bond.

The Convention of August, 1875, was ratified by the Belgian and French Legislatures, but rejected by the Dutch in 1876.

Apparently the rejection of the Convention by the Dutch Assembly was owing to an impression that by its adoption Holland would be prevented from abolishing its sugar duties should it be considered advisable to do so, for in April, 1876, one month after the rejection of the Convention, the Dutch Assembly passed a resolution calling upon the Government to re-open negotiations upon the basis of the Convention, coupled with a proviso that Holland would be at liberty at any time to abolish its sugar duties.

The Dutch Government, in accordance with the vote of the Assembly, immediately commenced negotiations for another Conference. France, having meanwhile passed a law establishing the system of saccharimetry, objected to entering another Conference on the basis of refining in bond, and proposed a Conference on the basis of saccharimetry, but an objection was raised to entering a Conference on this basis, and eventually it was agreed that no method for the abolition of bounties should be excluded from discussion. On this understanding the Conference assembled in Paris in July, 1876.

The French delegates, while expressing themselves willing to accept refining in bond, if it could be shown that no other system was efficacious, proposed the adoption of saccharimetry. This system was fully examined and discussed, and rejected as not being efficacious.

The Conference eventually suspended its sittings without any agreement having been arrived at, in order to report to the respective Governments with a view to the subsequent resumption of the Conference, to which it was proposed to invite Austria, Germany, and Italy. The French delegates at this Conference raised the question for the first time of the bounty given by Austria on the export of raw sugar, but it was decided that this did not form part of the programme of the Conference.

On the result of the Conference of July, 1876, becoming known, a strong agitation was commenced in France in favour of carrying out the law of the Assembly, which had been kept in abeyance, for refining in bond, and as the result of an extra official inquiry set on foot by about a hundred members of the French Assembly, who took evidence on the question, a note was presented to the French Minister of Commerce, desiring that the delegates who should represent France at the adjourned Conference should be governed by the decision of the National Assembly, which had voted refining in bond, that this should form the basis of a treaty, and not saccharimetry, and that equivalents for refining in bond should be accepted, especially suppression of duties.

The Conference re-assembled in February, 1877, Germany, Austria, and Italy having declined to send delegates, and after a long and complicated discussion, agreed upon a Convention to be submitted to the respective Governments, providing that sugar factories and refiners in France and the Netherlands should work under bond, and that Belgium should make certain specified modifications in her system, and reduce her duties by one-half. It also provided that in the event of countries outside the Convention giving bounties on the export of sugar, either raw or refined, a new understanding might be promoted, in order to consider in concert as to the measures of defence which might be taken.

The draft Convention was assented to by the Governments of France, England, and Belgium, but objections were raised by the Dutch Government on points of detail. They thought Belgium had not offered sufficient equivalents, and they objected to the definition of refining in bond in the Convention, because it did not

make it clear to them how France was to carry out the system. Mr. Walpole, our delegate at the Conference, was sent to the Hague and Brussels, and succeeded, apparently, in removing all the objections, but fresh objections were afterwards raised by the Dutch Government, who proposed that a new Article should be added to the Convention, providing that any country party to it might, as an alternative system, adopt that which had been assented to in the case of Belgium under similar conditions. After considerable negociation Sir E. Harris, our Minister at the Hague, was assured that the proposal with reference to this new Article would be withdrawn if France would consent to a slight modification of one of the Articles of the Convention. A mis-understanding appears to have arisen on the subject of the alteration required by the Dutch Government on the part of the French Government, and a change of Ministry having taken place in Holland, the new Ministry refused to proceed further in the matter, and ultimately intimated to Her Majesty's Government that they could not at that moment find any basis for the conclusion of an international agreement on the subject. Attempts have since been made by Her Majesty's Government to open fresh negotiations with the other Powers, but they have not been successful.

It will be seen that the negociations which have hitherto taken place have been confined entirely to the question of the bounties on refined sugar, and that although the question of the bounty on raw sugar was raised by the French delegates in the Conference of July, 1876, it was not entered upon.

It is, however, evident, both from the position taken up by the French sugar manufacturers and by the West India sugar growers, that no settlement of the question can now take place which does not deal with the bounties on raw as well as on refined sugar.

The systems of taxation, drawbacks, and bounties on the export of sugars at present in force in foreign countries vary considerably.

FRANCE.

In France no bounty exists on the export of raw sugar, as the sugar factories there are worked under excise supervision; and as

no duty is paid upon raw sugar there is no drawback, and, therefore, no bounty.

Sugar intended to be refined for export is entered into the refineries for temporary admission, and within two months a quantity of refined sugar, representing the legal yield of the raw sugar entered for temporary admission, has to be exported, and a certificate of exportation produced, or the duty has to be paid with interest.

The legal yield of refined sugar was, under the Convention of 1864, ascertained by colour, but since 1875 it has been determined by analysis.

Raw sugar entered for temporary admission is divided into five classes, each of which is composed of several different qualities, designated by numbers; and a legal yield of refined sugar is defined for each class, as follows:—

Raw sugars below No. 7	-	-	-	-	67 % yield.
„ „ from Nos. 7-9	-	-	-	-	80 % „
„ „ from Nos. 10-14	-	-	-	-	88 % „
„ „ from Nos. 15-18	-	-	-	-	94 % „
„ „ above No. 18, and <i>poudres blanches</i>					97 % „

It is admitted, however, that the actual yield is in excess of the legal yield, and as the refiner obtains the difference without payment of duty he consequently obtains a bounty.

This excess yield is obtained, it is alleged,—

By employing raw sugars of the highest numbers of each class; and as the legal yield in each class is the mean yield of all the numbers in that class, the employment by the refiner of the highest numbers only in each class secures an excess yield.

By the use of *poudres blanches* or white crystals. This is practically refined sugar, but being classified as raw sugar the refiner, on obtaining it from the manufacturer, has only to pay duty on raw sugar. When converted into loaves and exported, it represents the export of so much refined sugar.

By the incorrectness of the co-efficients 2 and 5 used in the process of analysis to determine the effect upon the crystalli-

sation of the sugar by the presence of glucose and ashes; it being contended that since these figures were determined upon, chemistry has considerably counteracted the effect of the presence of glucose and ashes.

By the falsification of samples and incorrectness of analysis.

Various estimates of the amount of the bounty in France have been made at different times. During the official enquiry of 1862-3, M. Grandval, a refiner from Marseilles, estimated that 10,000,000 kilogrammes of refined sugar escaped duty on an export of refined sugar of from 76,000,000 to 100,000,000 kilogrammes, by which M. Fould, the then Minister of Finance, estimated that the French Treasury lost £180,000.

In 1871 the duty was increased from 47 francs to 61 francs 10 centimes per 100 kilogrammes, and again in 1872 to 70 francs 50 centimes, and in 1873 to 73 francs 32 centimes, which correspondingly increased the bounties.

In 1872, M. Rouget, Inspecteur des Finances, and M. Jéronnez, Inspecteur des Services des Sucres, were charged by the Conseil Supérieur to make enquiries of the refiners who had consented to give information on the subject, and they estimated the amount of the bounty to be £320,000 on an export of 78,000,000 kilogrammes.

M. Hittorff, who was regarded as favourable to the refiners, put it at £447,200 on an export of 143,594,000 kilogrammes for 1872, and £507,640 on an export of 153,000,000 kilogrammes for 1873.

M. Ozenne, Secrétaire Général of the Ministry of Commerce, in the inquiry of 1872, accepted £480,000 as the amount of the bounty, while M. Jacquemart, Vice President of the Central Committee of Sugar Manufacturers, in the sitting of the extra Parliamentary meeting of the 30th of November, making his valuation on other bases, gave as his estimate £344,000.

In March, 1874, M. Pouyer Quertier, a former Minister of Finance, estimated the bounty at £800,000 on an export of 153,000,000 kilogrammes. This estimate was confirmed by M. Dupont, a Deputy, afterwards one of the delegates who represented France at the Sugar Conference of 1875, and also by a calculation made in Belgium.

In June, 1875, the Sugar Refiners' Committee submitted to Lord Derby a calculation by which they made the amount of the bounty in 1872, 14,586,636 francs; in 1873, 15,891,450 francs; and in 1874, 18,636,550 francs. M. Martineau contends that an addition of 6,200,000 francs has to be added to each of these estimates, in consequence of the duties in France not having been in correlation with the scale of the Convention of 1864.

The Law of December, 1875, establishing analysis instead of the colour standards previously in operation, reduced the bounty.

According to a calculation made by M. Jacquemart, the bounty in 1875 was 11,000,000 francs; in 1876, 10,000,000 francs; and in 1877, 8,000,000 francs. This calculation was accepted by the English refiners as a correct one, except that, according to them, the further sum of 6,200,000 francs mentioned above has to be added. The bounty in 1878 has been estimated by M. Fouquet, a Member of the Chamber of Deputies, and a raw sugar manufacturer, who gave evidence before your Committee at between 8,000,000 and 9,000,000 francs. To this amount, however, M. Léon de Mot, also a French raw sugar manufacturer, in his evidence states, that 2,573,000 francs has to be added on account of the bounty obtained by the use of *poudres blanches*.

M. Léon Say, while he was Minister of Finance in July, 1878, in answer to a deputation of British sugar operatives, stated, that after a most careful examination for the space of a year in the laboratories of the State, it was shown that the excess yield did not exceed 3,200,000 kilogrammes, representing, at 73 francs 32 centimes duty, a sum of 2,350,000 francs, which he stated was all the bounty the refiners obtained. M. Say has, however, favoured the Committee with a note upon the subject, in which the question of the amount of the bounty is treated in detail, according to which it is shown that, in 1878, the excess yield obtained was 5,152,332 kilogrammes, instead of 3,200,000 kilogrammes, as stated to the operatives, which, at the duty of 73 francs 32 centimes per hundred kilogrammes, amounts to 3,777,666 francs. According, however, to Mr. Martineau, and to the *Exposé des Motifs* of the new French Law, the duty on this excess yield should be calculated, not at 73

francs 33 centimes, but at 75 francs per 100 kilogrammes, the amount for which the refiner is able to sell his certificates in the market. Calculating, therefore, the excess yield as given by M. Say of 5,152,332 kilogrammes at 75 francs per 100 kilogrammes, the amount of the bounty thus obtained would be 3,864,249 francs. This calculation merely shows the excess yield obtained under the first of the modes mentioned.

With reference to the second mode, namely, the bounty obtained by the use of *poudres blanches*, M. Say states that as only 3,000 kilos. were entered for temporary admission during 1878, no bounty can be obtained by their use for export.

The reason why *poudres blanches* are not entered for temporary admission has been explained to your Committee to be that by paying the duty for home consumption, the refiner obtains a much more considerable bounty than he would obtain by entering them for temporary admission.

By entering *poudres blanches* for temporary admission the refiner would have to export 97 per cent. of refined sugar to clear it of duty, and as the actual yield of this class of sugar is 98·28 per cent., he would only obtain a bounty of 1 franc 28 centimes per 100 kilos. By paying the duty for home consumption he obtains a bounty amounting to the difference between this duty (70 francs 20 centimes) and the value of his certificates of export, 75 francs on the per-centge of refined sugar produced.

Mr. Martineau states that a certain proportion of *poudres blanches* enters into the composition of all loaf sugar that is made, and that the French refiners themselves, before the *enquête* in 1872, stated that they used from 25 to 33 per cent. of *poudres blanches* in all the loaf sugar they made. This statement finds confirmation in the figures given in M. Say's note, which show that about 25 per cent. of all the sugar used in the refineries in 1878 was of the *poudres blanches* class, the total used being 482,105,043 kilogrammes, of which 115,359,939 kilogrammes were *poudres blanches*.

The report proceeds to give a long account of the nature and extent of the bounties and their effect on the home and colonial sugar industries (which we will publish next month), and then continues:—

THE STEPS PROPOSED.

Before considering what steps it may be desirable to take, in order to bring about the abolition of the bounties on raw and refined sugar, the question arises whether, although these bounties are undoubtedly highly injurious to the producers both of raw and refined sugar, the benefits to the consumer may not be such as to render it undesirable in the general interest to take any steps for their abolition.

There can be no doubt that the effect of the bounties, so long as they continue, is to reduce the price, and so benefit the consumer; but if another effect of the bounties is to drive the natural production out of competition, the present advantage in price may be dearly purchased by the enhanced price that would then prevail. That they must ultimately have the effect, if they are sufficiently large, of destroying natural competition is acknowledged, and it is also acknowledged that bounties, if not stopped by other means, must ultimately break down by their own weight; so that eventually the consumer must cease to derive the benefit of the bounty, and should by that time the natural competition have been driven out of the market, the result to the consumer would be very mischievous. Hence it is of the utmost importance to the consumer that the natural sources of supply should not be destroyed.

It must also be remembered that assuming the consumer receives a benefit equal to that estimated by Mr. Giffen of £2,400,000 per annum, only a portion of this really comes out of the pockets of the countries giving the bounties, as only 330,000 tons out of a total import of 900,000 tons comes from countries giving bounties, a large portion of the bounty obtained by the consumer coming out of the pockets of the British producer.

Whatever, however, may be the amount gained by the consumer, your Committee entirely agree with the words of a letter addressed by the present Prime Minister to the Secretary to the Workmen's Committee, in 1879, as follows: "If, as I understand, the circumstances of the case continue unaltered, I think that both the trader and the workman engaged in the business of refining sugar have great reason to complain. My desire is that the

"British consumer should have both sugar, and every other commodity, at the lowest price at which it can be produced, without arbitrary favour to any of those engaged in the competition; but I cannot regard with favour any cheapness which is produced by means of the concealed subsidies of a foreign State to a particular industry, and with the effect of crippling and distressing capitalists and workmen engaged in a lawful branch of British trade"; and also with the declaration made by Mr. Gladstone in June, 1866, in reference to the Sugar Convention of 1864 for the abolition of bounties, that Her Majesty's Government could not but perceive that that would be a beneficial arrangement, beneficial alike to the importers, refiners, and consumers. The negotiations of the last 18 years show that Her Majesty's Government have adhered to this policy of procuring the abolition of foreign export bounties, whatever effect that abolition might have on the interest of the consumer.

Your Committee have therefore come to the conclusion that it is desirable not only in the interest of the trades concerned, but also for the general interest of the whole community, that the export bounties both on raw and refined sugar should be abolished, and in this opinion they are confirmed by the action taken by successive Governments to bring about this result.

The discussions which have taken place at the several Conferences on the subject, as well as the evidence which has been given before your Committee show that so long as a drawback is given upon export a bounty must exist. The only certain mode of altogether abolishing bounties is manufacturing and refining under excise supervision, by which method the sugar entering into consumption would alone be charged with duty, and no drawback would therefore be given on exportation.

Refining under Excise supervision formed the subject of an inquiry before a Select Committee of the House of Commons in 1862, and before that Committee the English refiners gave evidence in opposition to the application of this system to their refineries. In 1872, however, the objections previously raised by the refiners had been so far removed that they addressed a memorial to the Government urging the establishing of international refining in

bond, and expressing their willingness themselves to submit to it, and to pay the expense of the supervision, and they admitted that their previous objections had been much exaggerated.

Mr. Gadesden, in his evidence before your Committee, stated that many of the objections which he held to refining under excise supervision in 1862 had been removed in consequence of the process of refining having been much expedited since that time; also from the fact that the small refineries, in which fraud was principally to be apprehended, had given place to large ones.

Objections were also raised before the Committee of 1862 to refining under excise supervision by the customs authorities, but Mr. Walpole, the Assistant Secretary to the Board of Customs, in his evidence before your Committee, states that the conditions under which sugar is refined have so changed that, in his opinion, no difficulty would now be found in working the system. Mr. Lilley, the Surveyor General of the Customs, has also expressed his opinion that refining in bond could now be carried on without danger to the revenue and without inconvenience to the refiner.

The system of manufacturing sugar under excise supervision is now in full force throughout the 500 beetroot sugar factories of France, and distinct evidence was given before the inquiry instituted by the Superior Council of Commerce in France that no frauds took place. Evidence has also been given before your Committee by the President of the Central Committee of Raw Sugar Manufacturers of France, and by other raw sugar manufacturers that not only do they not find any difficulty in manufacturing under excise supervision, but that the presence of the officers is an assistance to them, and in no way an interference.

This system formed the basis of the Conventions of 1875 and 1877, and has received the assent of the Legislatures of Holland and France.

The Convention of 1875 was, it would appear, rejected by the Dutch Assembly under a misapprehension as to their power under it of abolishing their duties; and the Dutch delegates at the subsequent Conference were the strongest advocates for refining in bond. The Convention of 1877, according to M. Georges, the President of the Central Committee of Raw Sugar Manufacturers

of France, was not ratified because of the opposition of the sugar refiners of France, and because of the persistency with which the French Government advocated the levying of a preliminary duty on the entry of raw sugar into the refinery and taking the balance and checking it as it goes out of the refinery.

This opposition on the part of the French refiners would not, it is stated, be met with in any future negotiations having refining in bond as the basis, as at a meeting of the Central Committee of the Raw Sugar Manufacturers of France and the Committee of the Paris Sugar Refiners a common understanding was arrived at, and a memorandum signed by the principal refiners of Paris, and produced before your Committee by M. Fouquet.

This memorandum accepts the principle of refining and manufacturing in bond as the basis for an international Convention under certain conditions, one of which is as follows:—"The countries contracting engage to levy a uniform tax (which shall never be returned), on the admission of sugars originating in or coming from countries non-signatories of the Convention where a duty on sugar exists."

This condition is practically that which has been advocated by all the witnesses who have appeared before your committee on the part of the refiners and producers, under the name of a countervailing duty, which it is proposed should be levied on sugar, both raw and refined, coming from countries where a bounty is given on export.

It is contended that such a duty would be equivalent to the protection of our sugar industries, contrary to the principles of the whole system of the commercial policy of this country, and an interference with the freedom of trade; that were the principle admitted, there is no reason why it should not be extended to compensate by a bounty our manufacturers for the import duties of foreign countries; that it would be found in operation so attended with difficulties as to be impracticable, and that it would be contrary to the provisions of our commercial treaties with foreign Powers.

Upon this subject the Treasury in 1876, in answer to the West

India Committee, wrote that the proposal of a countervailing duty "rests upon a principle which the Government of this country "could not admit without reversing its whole system of commercial "policy. If the doctrine was still maintained that the Government should adopt fiscal measures for other than fiscal objects, "and should attempt to make such measures an engine for assisting British manufacturers to compete on what may be considered "equal terms with their foreign rivals, the present case might, "undoubtedly, be considered a very proper one for the application "of such a principle. But it cannot be doubted that if the Government were to act on this doctrine in the present case, it "would soon be called upon to do so in other cases also. Their "Lordships are of opinion that the Government ought not to "countenance such a step unless it is prepared to review the whole "code of commercial legislation in this country."

This statement seems to your Committee to be based on the assumption that other trades are subject to similar treatment to that which is complained of in the sugar trade; but so far as the evidence before your Committee goes, there does not seem to be any other industry placed in the same position as the sugar industries, nor does it appear that the sugar growers and refiners claim to be placed in such a position as to enable them to compete on equal terms with their foreign competitors except so far as that their trade shall not be destroyed by means of a foreign bounty; and that if that bounty cannot be stopped by negociation, other means to effect the same object by a countervailing duty should be adopted.

A countervailing duty, not exceeding the bounty on export, would place no impediment in the way of imports from countries parties to the Convention for the abolition of bounties, as it would not be imposed upon their produce; in the case of imports from countries outside the Convention giving a bounty, the duty would merely collect the bounty, and in either case the country which possessed natural advantages would still obtain the benefit of those advantages in competition with our own manufacturers. A bounty, on the other hand, places all countries who do not give bounties at

a disadvantage in our market, and deprives them of any natural advantages they may possess; it deprives our own producers of the opportunity of free competition in our own markets, and, if sufficiently large, renders it practically impossible for them to carry on their trade. A countervailing duty is not therefore in any sense of the term protection.

The question of compensating our manufacturers by a bounty for the import duties of foreign countries appears to your Committee to be an entirely different one from that under consideration. The effect of the import duties of a foreign country is simply to exclude or to partially exclude our manufacturers from that country, which every country has a perfect right to do; but the effect of a foreign bounty is to exclude our own manufacturers from our own markets, and against that it is perfectly legitimate to take measures of defence. As a matter of practical application, also, the results would be entirely different; the granting of a bounty to our manufacturers would not necessarily obtain their admission to foreign countries, as, where the object is protection to native industry, the granting of a bounty by this country would be at once followed by a raising of the import duty in the importing country, and the object would not be attained; whereas the imposition of a duty to countervail a bounty would at once deprive the article on which the duty was levied of the artificial advantage of the bounty it had received on export, and were the imposition of the duty followed by the raising of the bounty it could be met by the raising of the duty; and as the object of the country giving the bounty may be presumed to be, not the benefit of the exchequer of the country to which the article is sent, but the advantage of its own manufacturers, the granting of the bounty would, in all probability, cease immediately it was proposed to collect it in the shape of an import duty, and so the object would be attained. Suppose, however, the bounty-fed article still continued to be imported and to pay an import duty not exceeding the bounty, the price of the article would not be raised above its natural level, provided the duty did not exceed the bounty, and so there could be no protection to the home manufacturer.

The principle of a countervailing duty has been recognised and assented to by this country in the Sugar Convention of 1864, the 19th Article of which is as follows:—"The high contracting powers reserve to themselves to agree as to the steps to be taken "for obtaining the adhesion of the Governments of other countries "to the arrangements of the present Convention. In the event of "bounties being granted in the said countries on the exportation of refined sugar, the high contracting parties will be at "liberty to come to an understanding as to the surtax to be "imposed on the importation of refined sugars of and from the "said countries."

This Article, which, although not compulsory, clearly recognises as open to consideration by the high contracting Powers the question of the imposition of a countervailing duty, was assented to by the British delegates at the Conference without, so far as the *procès verbaux* indicate, any remark, and accepted by the Government of the day, without protest.

On the question of the practicability of levying the duty, your Committee have had evidence from the Assistant Secretary to the Board of Customs, the Surveyor General of Customs, and the Collector of Customs of the Port of London, to the effect that while a variety of duties, involving as it would do the production of certificates of origin for sugar claiming to be admitted free, would lead to considerable trouble, no difficulties existed which would prevent the duty being collected, and that any difficulties which did exist would be materially diminished, if not altogether removed, were the impost a uniform fixed sum.

Should a uniform rate of duty be fixed upon, in order to exclude the possibility of protection in favour of those countries which do not give a bounty the tax should be adjusted so as to correspond as exactly as possible with the bounty paid.

There would be, on this ground, an objection to the uniform duty, inasmuch as it may be admitted that the amount of the bounty varies considerably, and there would, no doubt, be great difficulty in ascertaining the precise amount of bounty actually received by the exporter in any one country.

The evidence before the Committee tends, however, to show that in the opinion of the West India producers and the British refiners, a uniform duty of 2s. per cwt. on all raw and refined sugar exported with drawback would be sufficient to ensure the desired result.

The rate of duty would, however, in the event of an international Convention being arrived at, have to form the subject of an international agreement.

It is no part of the duty of your Committee to express an opinion on the legal bearing of a countervailing duty on the most favoured nation clause in our commercial treaties, but it seems to them that were a duty imposed upon all sugar imported, with a proviso that when satisfied that the laws of any country afforded reasonable security against the importation therefrom of bounty-fed sugar, the sugar coming from that country should be admitted free, similar treatment would be accorded to all countries coming under similar conditions.

Your Committee would also point out that Article 19 of the Convention of 1864, providing that under certain circumstances the expediency of a countervailing duty might be considered, was assented to by Her Majesty's Government notwithstanding the treaty with Russia, then in existence, which contained a stringent most favoured nation clause.

Mr. Kennedy has, however, in the supplementary evidence he has given, stated that, in the opinion of the Foreign Office, a countervailing duty could not be imposed in this country consistently with our commercial treaties. Your Committee, therefore, while on the question of principle they see no objection to the imposition of a duty to countervail a bounty, and on the practicability of levying it no insurmountable difficulties, feel themselves precluded from recommending its adoption in the face of the statement made by Mr. Kennedy. At the same time they would recommend that Her Majesty's Government should institute careful inquiry into the matter, as in the event of it being found impossible to arrive at an international agreement for the suppression of bounties without Her Majesty's Government assenting to the insertion of

a clause similar to Clause 19 of the Convention of 1864, your Committee would have been prepared to recommend the adoption of such a course had it been practicable under our existing treaties, and they are of opinion that in any renewal of those treaties the opportunity should be taken of making such alterations as would leave Her Majesty's Government at liberty to deal with the question.

Evidence has been laid before your Committee that the sugar manufacturers and refiners of France, and also the sugar manufacturers of Holland and Belgium, would support a proposition for an international Convention for the suppression of bounties on raw and refined sugar, and the resolutions recently passed by the Austrian Chamber of Deputies point in the same direction. These are the principal countries in which it has been shown that bounties on export to any extent exist.

Your Committee, therefore, recommend that steps should at once be taken by Her Majesty's Government to invite all the sugar-producing powers to a Conference, with a view to the conclusion of a Convention for the abolition of export bounties on both raw and refined sugar on the basis of manufacturing and refining under excise supervision, the question of equivalents for this system not being excluded.

CONCLUSIONS.

Your Committee would sum up their conclusions, as follows :—

- (1.) That the effect of the system of bounties on the exportation of sugar, raw and refined, now in force in various foreign countries has been injurious to both our home and colonial sugar industries.
- (2.) That the effect has been to, practically, extinguish the loaf sugar refining trade.
- (3.) That the development of the sugar-growing industry of our colonies has been checked, and their future prosperity endangered.
- (4.) That it is expedient that immediate steps be taken to obtain such an alteration in the present systems as will stop the granting of bounties on sugar, both raw and refined.
- (5.) That the most effectual mode of securing this result is manufacturing and refining under excise supervision.

(6.) That Her Majesty's Government should invite the sugar-producing powers to a Conference, with a view of arriving at a common understanding for the suppression of bounties on the basis of manufacturing and refining under excise supervision, the question of equivalents for this system not being precluded from consideration.

(7.) That should the Commercial Treaties to which this country is a party, prevent Her Majesty's Government from taking part in an International Convention which provides for common action of defence against countries giving bounties, Her Majesty's Government should, on the renewal of those Treaties, and also in the negotiation of new ones, take into their consideration the propriety of stipulating for such liberty of action as will enable them in the last resort to impose a countervailing duty.

4th August, 1880.

THE FAVOURED NATION CLAUSES AND FOREIGN SUGAR BOUNTIES.

The Workmen's National Committee for the Abolition of the Foreign Sugar Bounties invited, in July of last year, an expression of opinion from Sheldon Amos, Esq., of the Inner Temple, late Professor of Jurisprudence to the Council of Legal Education of the Four Inns of Court, and Wallwyn P. B. Shepheard, Esq., of Lincoln's Inn, their Honorary Adviser on Treaty and Economic points, upon the question as to whether the favoured nation clauses in our Commercial Treaties precluded us from countervailing foreign export bounties, and the Workmen's Committee received in reply the following important letter:—

To THE SECRETARY OF THE WORKMEN'S NATIONAL EXECUTIVE
COMMITTEE FOR THE ABOLITION OF THE FOREIGN EXPORT
SUGAR BOUNTIES.

July 22nd, 1879.

Sir,

The question submitted to us by the Workmen's National Executive Committee for the Abolition of Foreign Bounties is

whether the imposition by Great Britain of a countervailing duty against sugar upon the export of which a bounty was obtained, whilst sugar upon which no bounty was obtained was subjected to no such duty, would contravene the most favoured nation clauses of existing commercial treaties.

Before considering the question from a juridical point of view, it is necessary to settle the meaning of the term "bounty." For the purpose of this opinion, we confine the term bounty to that proportion of drawback which is in excess of actual duty paid. It is not necessary to discuss how such excess arises, but it is evident that when a State returns on all exported sugar a particular amount by way of "drawback," and such amount is in excess of the duty actually levied, such excess amount constitutes an actual premium or bounty on exportation.

An exporter from a foreign country receiving such a bounty becomes an importer into this country, possessing a tariff or fiscal advantage over other importers not enjoying a bounty. This seems such an obvious economic consequence that we are entitled to assume it as such without discussing purely economic points.

Although this tariff advantage is not created by the importing State; yet it can only be enjoyed by the foreign exporter upon sufferance of the importing State, therefore such tariff advantage virtually depends upon the negative action of the importing State.

We also assume that the countervailing duty to which our opinion is to apply is a duty which shall correspond in amount to the bounty as defined. We further assume that if such a bounty as defined be met by such a duty as defined, the importer enjoying such bounty, but liable in consequence to such duty, is thereby in no different fiscal position to an importer enjoying no bounty and paying no duty.

These points are such as must be established by economic reasoning, and for the purpose of this opinion we are asked to assume them, and we do so without expressing our opinion as to their validity on economic grounds.

For the purpose of illustrating the arguments which lead to our conclusion, we propose to take the Treaty of Commerce between Her Britannic Majesty and His Majesty the Emperor of Austria of 1876. This treaty was for one year, and expired on the 31st December, 1877, but previous to such expiration was renewed by a subsequent treaty of 26th November, 1877, from year to year, at a year's notice of denunciation from either side from any date. We understand that the treaty so renewed is still in force.

The 1st Article of the Treaty defines the rights of the subjects of either sovereign power resident in the territories of the other.

The 2nd Article is as follows :—

ARTICLE II.

The produce and manufactures of, as well as all goods coming from Austria-Hungary, which are imported into the territories and possessions, including the colonies and foreign possessions, of Her Britannic Majesty, and the produce and manufactures of, as well as all goods coming from, British possessions, which are imported into the Austro-Hungarian monarchy, whether intended for consumption, warehousing, re-exportation, or transit, shall therein, during the continuance of this treaty, be treated in the same manner as, and in particular shall be subjected to no higher or other duties than, the produce and goods of any third country the most favoured in this respect.

No other or higher duties shall be levied in the Austro-Hungarian monarchy on the exportation of any goods to the territories and possessions, including the colonies and foreign possessions, of Her Britannic Majesty, or in the territories and possessions, including the colonies and foreign possessions, of Her Britannic Majesty, on the exportation of any goods to the Austro-Hungarian Monarchy, than on the exportation of the like goods to any third country the most favoured in this respect.

The two high contracting parties likewise guarantee to each other treatment on the footing of the most favoured third country in regard to the transit of goods through the territory of the one from and to the territory of the other.

The 3rd Article is as follows :—

ARTICLE III.

Every reduction in the tariff of import and export duties, as well as every favour or immunity that one of the contracting parties grants to the subjects and commerce of a third Power, shall be participated in simultaneously and unconditionally by the other.

The 4th Article is as follows :—

ARTICLE IV.

The stipulations of the foregoing Articles, I to III., relative to the reciprocal treatment on the footing of the most favoured third country, shall not apply—

1. To those special and ancient privileges which are accorded to Turkish subjects for the Turkish trade in Austria-Hungary.
2. To those advantages which are or may be granted on the part of the Austro-Hungarian monarchy to the neighbouring countries solely for the purpose of facilitating the frontier traffic, or to those reductions of, or exemptions from, customs duties which are only valid in the said monarchy for certain frontiers, or for the inhabitants of certain districts.
3. To the obligations imposed upon either of the high contracting parties by a Customs Union already concluded, or which may hereafter be concluded.

The 5th Article is as follows :—

ARTICLE V.

Neither of the high contracting parties shall establish a prohibition of importation, exportation, or transit against the other which shall not, under like circumstances, be applicable to the third country most favoured in this respect.

The 6th Article refers to trade-marks, &c.

The 7th Article determines the duration of treaty.

And 8th Article provides as to its ratification.

From the foregoing it appears that our opinion must be

governed by the interpretation to be placed on Article II., which may be concisely described as a favoured-nation importing and exporting clause.

We are of opinion that under this clause, Her Majesty has become bound (*inter alia*) to accord to Austria every advantage in respect of her exports to this country accorded to the most favoured third country; and this equality of fiscal conditions between such most favoured third country and Austria, the latter State must be taken to have accepted as the basis of the compact.

Moreover, Her Majesty has been likewise bound to same effect by similar clauses in other treaties to France, Germany, Belgium, Italy, &c. The result, then, of these respective obligations can only be attained by the produce of each of the several exporting countries being admitted on terms of fiscal equality into this country. If, therefore, one of such exporting countries destroys this equality by giving a fiscal advantage which it is within the power of this country to neutralise, we consider that the interpretation of this clause would favour rather than preclude the exercise of such power.

Independently of all treaties, each country has full power to deal with importations from other countries on any terms it pleases—to exclude some and to favour others. The favoured nation clause is a restriction upon this power, in order to bring about equality of fiscal conditions between the importers from either treaty power and importers from third countries into the territories of the other treaty power.

Moreover, it is clear that the articles of a treaty of commerce are directed to the interests of classes of the subjects of the respective sovereign powers in their several characters as importers, exporters, &c. Therefore the injurious operation of any State tariff or fiscal arrangements upon importers, exporters, &c., in their respective characters as such, raises a proper question under the treaty. And in our opinion, it is not the less a treaty question, because it may happen that the fiscal action which prejudices some one class of citizens in their treaty characters may benefit some other class. Therefore, we are of opinion that imports of sugar

into this country may, without contravening the favoured nation clauses of existing commercial treaties, be distinguished as to countries of origin wherein bounties on export are or are not obtainable, and a countervailing duty levied on sugar imported from countries where export bounties are obtainable, whilst sugar from all other countries is admitted duty free. This construction is consistent with the fact that the Sugar Convention of 1864 between Great Britain, France, Holland, and Belgium contained an article admitting the principle of the imposition of a differential surtax against countries, not parties to that Convention, giving export bounties, notwithstanding that at the date of that Convention this country was bound by treaty with Russia to admit her products at no "other or higher duties than are or shall be payable on the like article the growth, produce, or manufacture of any other foreign country." [See Treaty of Commerce with Russia, 1859, Art. 2.]

Moreover, notwithstanding such article in the Convention of 1864, favoured-nation clauses were contained in the commercial treaties entered into during the period of ten years for which that Convention was in force; and such favoured-nation clauses must be held as subject to the treaty engagements under which, during such period, Great Britain was subject by that Convention of 1864.

In conclusion, we beg to state that our opinion is based upon the broad principle that equality of fiscal condition, as between either Treaty Power and any third country the most favoured by the other Treaty Power, is the object of favoured-nation clauses, and that the one who destroys such equality cannot appeal to the treaty against the act necessitated to reinstate that equality.

We are, Sir,

Yours obediently,

(Signed) SHELDON AMOS, of the Inner Temple,
Barrister-at-Law.

Professor of Jurisprudence to the Council of Legal Education of
Inns of Court for three years ending 1875, and late Professor
of Jurisprudence to University Coll., London.

(Signed) WALLWYN POYER B. SHEPHEARD, of
Linc. Inn, Barrister-at-Law.

THE "SUGAR SWINDLE."

An article headed "The Sugar Swindle" appeared, shortly before the Select Parliamentary Committee on the Sugar Industries issued their report, in the columns of the *Weekly Dispatch*, a paper possessing considerable influence with the working classes. This article originated a correspondence between that paper and Messrs. Peters and Kelly, the Secretaries of the Workmen's National Executive Committee for the Abolition of the Foreign Export Bounties. With commendable fairness the Editor of the *Weekly Dispatch* permitted the Workmen's Committee to combat the views put forward in that article, and the issue of the controversy resulted in a fairly won success for the Workmen's Committee. The article alleged that the Select Committee was about to issue a protectionist report in order to prop up "a business so sickly that "it could not be carried on at a profit unless those in it are allowed "to rob their customers by exacting forced prices;" that "countervailing protective duties on imported sugar would hurt no one "so much as ourselves;" and that such duties "would compel "English working people to pay an indirect tax on sugar to the "extent of £2,500,000." In the reply of the Working Men's Committee to this article, the allegations as to protection, &c., were dealt with as follows:—

"The first assumption in the article is that the Sugar Industries Committee is about to present a 'protectionist report.' That assumption is utterly and completely without foundation. We have been present, with other delegates of our trade societies, at every meeting of that Select Committee, which was appointed by Parliament mainly through the pressure brought to bear by the trade societies, whose members were most deeply affected by the existence of foreign export bounties on Continental beet sugar. Having followed, therefore, with vigilant interest every word of evidence given before that Select Committee, we are in a position to state that no suggestion of a protectionist character has been made except by Sir Louis Mallet, C.B., who in the course of his evidence plainly hinted at the grant by our State of bounties to compensate us for the loss sustained through competition with foreign export bounties. The workmen's agitation against foreign bounties originated with workmen under the cruel pressure of loss of home and employment through this foreign protectionist

device ; the agitation has been, and is being, and until bounties cease will be, conducted by workmen responsible to their trade societies and their fellow workmen throughout the country. And why ? Because the bounty question is essentially a wages question. A leading official witness examined before the Committee recognised this fact when he said, in our hearing, that 'he thought that reducing the wages of the working men and keeping on the bounty was better than taking off the bounty and keeping wages as they are.' "

" If the sugar industry of this country were, as the writer of the article in question states, a 'business so sickly that it cannot be carried on at a profit,' why we ask—and we expect to be answered—have the foreign beet sugar industries been compelled to obtain both protection against us in their own markets by hostile tariffs and also State subsidies to enable them to come over and compete on our markets ? "

" Now, let us assume with the writer that foreign bounties depreciate the value of sugar on our markets one farthing per pound, amounting to £2,500,000, why does the writer suppress the fact which we must now state, that a very large proportion of that sum is no gain to the nation, because it comes out of the pockets of the British producers, who have no State bounties to fall back upon ? This is the real 'Sugar Swindle'—swindling our workmen out of their wages by forcing them to compete on our own markets with foreign export bounties."

In reply to a second article commenting on the letter of Messrs. Peters and Kelly, a further letter from the Workmen's Committee was published, wherein they write :—

" Our case is not only that the legitimate demand for labour arising out of our increased consumption of sugar has been diverted by the protectionist device of bounties or State subsidies from this nation to the continent of Europe, but also that the wages of such men as are still at work are forced down below their natural level by competition with foreign bounty-exported sugar. Of course, bounties must be met somehow, but we decline to assent to the views of the Government official who told the Select Committee in our presence that it was better to reduce wages than abolish bounties."

" We trust, Sir, you will credit us that our sense of responsibility towards our fellow-workmen is too great to permit us to advocate, in order to save the labour incidental to our national sugar industry from calamity, any measures violating the natural laws of commerce, by which prices of goods ought to be adjusted. But on the other hand, as wage-earners in this particular industry, we equally object to have natural laws of prices violated to our detriment by these foreign export bounties. Now, whether these

bounties are abolished, or intercepted by duties, the effect on prices is similar. And you must please remember that all sugar, from whatever source, British or foreign, imported without bounty would enter duty free; consequently, would be sold duty free, and thus compel the foreigners who had bounties to use up their bounties in paying our duty. So the duty is a tax on bounties, not on sugar. In other words, if foreign States are foolish enough to tax themselves to raise a sum of money to favour their sugar importers, and enable them to under-sell us, our State is wise enough to pocket this sum of money for our taxpayers through the revenue. This is the view taken of the countervailing duty by the Oxford prize essayist of the Cobden Club. We know Customs duties must be paid by the buyers of the goods, except in the case where export bounties exist to pay the duties. The long and short of the whole matter is, we must either meet bounties out of wages and profits, or intercept them by countervailing duties."

"As regards the moist refined sugar industry to which you refer that is now, for the first time, exposed—at least, it will be on the 1st of next October—to a competition with a bounty under the new French law. This fact, when we attended the recent trades conference in Scotland, caused all branches there engaged in moist sugar refining great concern."

"As regards the bounty now existent in France, their Government admit it in the preamble of the new French law as 6fr. per 100 kilos.—that is, 2s. 6d. per cwt."

"You invite us, Sir, to give the freights of sugar. They are:—From Paris to London, 8s. 6d. per ton, or *vid* Treport or Dunkirk, 12s. to 13s. per ton; from Havre, 7s. 6d. per ton; from Amsterdam, 6s. per ton; from Rotterdam, 4s. per ton—ranging thus from 2½d. to 7½d. per cwt."

"As regards the so-called bounties referred to in the latter portion of your article, these are not fiscal or State bounties; they are natural advantages which we have no right to intercept. What we have to intercept in the sugar bounty is an actual cash subsidy created by the State, available only for export purpose; and, unless we stop or intercept this bounty, we either are over-powered, or must give its equivalent out of our own pockets."

The *Weekly Dispatch* urged, in reply to the preceding letter, that there were only about "5,000 odd hands engaged in sugar refining, and as four-fifths of them are stated to be unskilled labourers, the difficulty of transferring their services to other trades should be comparatively slight," and that countervailing bounties by import duties "would simply be taxing the working class as a whole in order to let the workmen in the sugar trade earn better wages."

To these assertions the Workmen's Committee replied :

"That export bounties had, in their experience, the exact effect attributed to them by Mr. Gladstone when he wrote thus to the Workmen's Committee :—'I cannot regard with favour any cheapness which is produced by means of the concealed subsidies of a foreign State to a particular industry, and with the effect of crippling and distressing capitalists and workmen engaged in a lawful branch of British trade.' But surely it cannot be said that if bounties cease, and this artificial cheapness ceases with them, we are raising the price of sugar, and so taxing our fellow-workmen? Nor would the effect of a countervailing duty—payable, be it remembered, out of the bounty—be different as regards the consumer to the effect of the cessation of bounties. In fact, were international free trade in sugar production established in Europe, there would be a slight rise in the average price of sugar in this country until natural prices were reached. In other words, natural prices would supersede artificial ones."

Quoting passages from Cobden's speeches in support of the principles of free trade requiring competition at "natural prices of the world's market," and Professor Cairnes, to the effect that "free trade was content to turn natural laws to the best account; it did not seek to transcend them," the Workmen's Committee concluded their correspondence by stating :

"The number of men in the United Kingdom earning wages in connection with the home and colonial sugar industries, from a return obtained from our secretaries over the country, are upwards of 20,000. We most respectfully demur to the statement that what are termed unskilled labourers can easily recompense themselves 'by transferring their services to other trades.' To do so does not increase the demand for labour, but simply displaces labour, or lowers wages in the 'other trades' referred to. From our experience in this agitation against foreign bounties, during which we have held open public meetings in all the large industrial centres, we are confident we have the support of our fellow-workmen in our endeavour to emancipate a large section of home labour from competition with the protectionist artifice of foreign export bounties."

The *Weekly Dispatch*, without withdrawing from its opinion as to the protectionist character of a countervailing duty, brought the controversy to a close by stating : "We agree with the Workmen's Committee that the foreign bounty system is very objectionable, and one to be got rid of, if possible, by all fair means."

Another important organ of working class opinion, viz., the *Weekly Times*, commenting on the Report of the Select Committee, in its issue of the 15th ult., states:

"Few Parliamentary papers have been awaited with more interest than that containing the conclusions of the Select Committee of the House of Commons appointed early in the Session to inquire into the effects of the foreign sugar bounties upon the home trade. This document has now been issued, and as the livelihood of many thousands of persons engaged in the sugar trade will depend, in a great measure, upon the action which will follow the Report of the Committee, its importance cannot well be over-rated."

"The patient attention which the Select Committee has given to the matter, and the able Report of its Chairman, Mr. Ritchie, make it abundantly clear that the English refiners who have their capital embarked in the sugar trade, and the vast numbers of skilled workmen who, until the last few years, were employed in this business, have a substantial grievance which requires immediate redress. Everyone who is interested in the large manufactures of this country is fully aware that, for the last fifteen years, there has been a gradual decline in the refining of sugar, until the production of loaf sugar in England may be said to be *nil*. On the other hand, the home trade of moist sugar refining has continued to show a large and progressive increase, simply because no artificial encouragement is given abroad to the manufacture of this particular kind of sugar. Large as the increase has been in moist sugar, it is utterly incapable of making up for the loss on loaf sugar, which is now universally used, and the consequence is the loss of a large amount of capital, and the ruin of numbers of those who were engaged in the business. France and Holland are the countries from which the bulk of the bounty-fed loaf sugar reaches England; but the position of the moist sugar trade shows that our home manufacturers would have nothing to fear from foreign competition so long as it was conducted on fair terms. If the time should ever come when the foreigner can produce sugar from his home-grown beet cheaper than we can refine that grown from the cane in our West Indian colonies, nothing will remain but to submit to the force of circumstances, and make the best of it, and this fact is accepted both by masters and men who do not fear fair competition. On the contrary, if foreign governments did not allow drawbacks and bounties on loaf sugar, the comparative cheapness of coal here would enable England not only to supply her own consumers on advantageous terms but also to compete in foreign markets. Having thus briefly placed the actual position of the refiners before our readers, we will now glance at the question from the consumers' point of view, and as one affecting those free-trade principles which have long been

one of the watchwords of the Liberal party. For the sake of argument, we will adopt the figures of Mr. Giffen, who estimates that the bounties allowed to the foreigner enable us to get our supply of sugar from abroad at an annual saving of about two and a-half millions sterling. It is thus self-evident that the effect of the bounties is to reduce the price and benefit the consumer to this amount, to the detriment of the home producer. But, looking to the future, the committee very rightly point out that this benefit is only a temporary one, and if its ultimate effect is to ruin our home trade, and so do away with all competition, when that is accomplished an enhanced price would be charged, and the consumer would pay dearly for his temporary benefits. Taking this view, it is not surprising that the Committee arrived at the conclusion that it is as much in the interest of the general community in the long run, as of the trades concerned, that the bounty system should cease."

THE PAST BEET-ROOT CROP.

Last Autumn, when many wild statements were going about as to the probable deficiency of the coming beetroot crop, we ventured to hazard an estimate (Vol XI., page 584), which was fortunately based on full and reliable information. The result has turned out curiously near our guess.

Our Estimate.....	1,380,000 Tons.
Actual Crop	1,365,000 ,,

FOR INTENDING EMIGRANTS TO DEMERARA.

One of our correspondents in Demerara writes us as follows :— “ You would do a number of young men a kindness if you would caution them not to be in too great a hurry to come out here as overseers. Demerara is a most expensive place to live in. He is told at home that he will get board and lodging, and two hundred and fifty a year to begin with. Board means that he is called over to the manager's house to be fed at irregular intervals. Lodging means an empty room, which he (the overseer) has to furnish, and two hundred and fifty a year means \$250, or £52 1s. 8d.”

THE WORKMEN'S ANTI-SUGAR BOUNTIES AGITATION.

[SPECIAL REPORT.]

On Wednesday night, August 11th, a General Delegate Meeting of the various branches of labour dependent for employment upon the home and colonial sugar industries, was held at the Central Committee Rooms, Commercial Road, London, for the purpose of taking into consideration the Report of the Parliamentary Committee, appointed by the House of Commons to enquire into the operation of foreign bounties upon the export of foreign raw and refined sugars, and their effect upon the British home and colonial sugar industry.

Mr. JOHN MONTEITH, President of the London Executive Association, occupied the chair, and delegates were present from the following industries: Coopers, Coppersmiths, Sugar Refining Operatives, Charcoal Burners, Carriers, Dock Labourers, Warehousemen, Sugar Engineers, and London Lightermen.

The CHAIRMAN, in addressing the delegates, remarked that he thought the Select Committee had done pretty well all they possibly could do under the existing circumstances, and it now devolved upon them to give some tribute of thanks to Mr. Ritchie, the Chairman of the Committee, for the able manner in which he had conducted the matter right through, and also for his kind and courteous treatment. (Hear, hear.)

Mr. SAMUEL PETERS, of Bristol, General Secretary of the Workmen's National Executive Committee, congratulated the delegates assembled upon the fact of the Select Committee's Report being in accordance with every statement that the Workmen's Committee had placed before the public, relative to the great grievance that they had suffered through the foreign bounty system. He was also glad to state that the Committee had recommended to Government the immediate conference of European nations to take into consideration the abolition of the bounties, and had also recommended to the Government to give their representatives

authority to agree to countervailing duties against any nation standing outside that Convention. As they had found the report satisfactory it was the duty of the Workmen to urge upon the Government the recommendations of the Committee, and to carry on their agitation until Parliament had adopted those recommendations, and restored to them their trade, of which they had been unjustly deprived through the protectionist artifice of foreigners. (Cheers.) *

Mr. L. GILLMAN, Secretary of the Hand-in-Hand Society of Coopers, then proposed the first resolution, which was as follows : "That this Meeting of the Committee of Delegates, representing every branch of labour connected with the home and colonial sugar industries, are quite satisfied with the Report of the Select Committee, and that instructions be given to the Executive Committee to at once hold public meetings in all the large towns of the country, viz.: Leeds, Liverpool, Bradford, Hull, Manchester, Birmingham, Birkenhead, Bristol, Plymouth, Burton-on-Trent, Bath, Dublin, Cork, Edinburgh, Glasgow, Greenock, and Midlothian, during the recess, for the purpose of further ventilating the question with a view of obtaining, even more than at present, public sympathy." The resolution was seconded and carried unanimously.

Mr. THOMAS M. KELLY, the Assistant Secretary of the Workmen's Committee, then moved the following resolution : "That in the opinion of this meeting of Delegates, the best thanks of the working classes are due and are hereby tendered to Mr. C. T. Ritchie, M.P., for his unceasing and arduous exertions both in and out of Parliament in the advocacy of the rights of British labour. This Delegate Meeting therefore appoints a Sub-Committee to draw up a suitable testimonial, to be inscribed on vellum and signed by the various Delegates of the trades of the country, and to be presented to the hon. member at a public meeting to be assembled at an early date." Mr. Kelly, in moving the resolution, said that in doing so he was conscious that no man deserved the thanks of the working people more than Mr. Ritchie. (Hear, hear.) When the deputation of the working classes waited upon Mr.

Ritchie three years ago and asked him to take up this great question, he did not hesitate to take it up, and tell the working classes that he would do all in his power to see that justice was done to British labour. From that time to the present moment Mr. Ritchie had never deviated, but kept straight to the mark, and had done his utmost to restore a great industry in this country and in the Colonies dependent on British legislation. He (the speaker) had attended all the meetings of the Select Committee, and had had abundant opportunities of watching the conduct of the Chairman, and no one could have given more attention or devoted more time and thought to the interests of British labour than the hon. member for the Tower Hamlets. (Loud cheers.) He (the speaker) had received some letters from the Clyde and Liverpool Workmen's Committees, and from both places the enquiry was, "What are you going to do for Mr. Ritchie?" Now the answer was this: he had served them well and nobly, and they ought to recognise it in a manner showing that they did not fail to appreciate it. (Hear, hear.) But although Mr. Ritchie had been released from his duties as Chairman of the Select Committee after three sessions of hard work, they must not release him altogether. No doubt if the working classes asked Mr. Ritchie to divide the House in 1881 on this question, he would divide it in the event of the foreign countries still persisting in granting these bounties, and he (the speaker) had no hesitation in saying that one of the chief gentlemen who would support Mr. Ritchie (if he was true to his previous utterances) would be no less a man than the Prime Minister, Mr. Gladstone. (Cheers.) This question involved the whole fundamental principle of free trade, and the best man, when the time came, would be found in the present Prime Minister. (Cheers.) He regretted to find that Mr. Courtney, the member for Liskeard, had taken an unfair opportunity, while Mr. Gladstone was ill, to take exception to what Mr. Gladstone had written and spoken on the bounty question, and therefore they ought to recognise that some men who prided themselves in being the champions of the people in Parliament, such as Mr. Courtney, were quite the reverse. But he trusted that with the aid of the friends they had

in Parliament on both sides, and with the health and strength of Mr. Gladstone in the session of 1881, they would be able to carry a measure embracing the principle of a countervailing duty against foreign bounties with a large majority. He wished to point out that although the Select Committee on the British Sugar Industries had reported very much in their favour, yet, as Wellington said, a battle was never won until the forces of the foe were completely vanquished. The press, from the *Saturday Review* to the *Echo*, had stated that the grievances of the sugar industry must be sent to the four winds of heaven ; but they must not look at the question as those papers did. They must understand that although the duty on loaf sugar in France had been lowered nearly one half, yet they had placed a bounty upon the export of moist sugar ; and just as the bounty upon loaf sugar destroyed the loaf sugar refineries of Bristol, London, Manchester, Sheffield, Hull, and other large towns, so would the bounty on the moist sugar destroy this trade in other places ; therefore it was the duty of the workmen to energetically protest and if necessary put a stop to the treaty between Great Britain and France until the equity of trade between one country and another was established. Mr. Gladstone had said that the treaty would not be brought to a termination without the working classes having an opportunity of expressing their opinion upon it ; and Mr. Gladstone had further said that the treaty so far as it concerned sugar would not be negotiated without very abundant opportunity being given to the working classes of expressing their opinion on the sugar legislation of France ; therefore he was pleased to say no negotiation whatever between France and Great Britain would commence until the next session of Parliament, when the Delegates would meet, and he hoped sugar would be included in the treaty. Hitherto sugar had been ignored in the treaty between France and Great Britain, and he wished to point out to them the fact that when Mr. Richard Cobden negotiated the treaty of 1860 he thought the British Sugar Colonies were so superior to the beet industries of France that there was no necessity whatever to include the article of sugar, but we found out that France and the other powers at once

gave a bounty upon the only article that was left out; but in the incoming treaty he was pleased to say sugar would, according to Mr. Gladstone, be included, and until that time it would be the duty of the workmen to watch their interests keenly. He would also call their attention to the fact that the Government of France had changed their legislation regarding shipping, and were about to give a bounty upon the building of ships in France, and the carrying of merchandise between France and the other parts of the world. France had said they would encourage the building of ships in France, and would give so much upon every £100 spent in the construction of ships, and so much for every ton of merchandise carried; the consequence was that although the working people of this country looked up with adulation to France as a pioneer of progress, yet the first act of the Republic of France was an attack upon the great staple industry of this country. The first act of President Grévy, of Gambetta, of Léon Say, was to agree to a law allowing bounties upon the building of ships and upon the carrying trade of France for the purpose of attacking the industry peculiar to this country. There seemed to be one cardinal principle operating upon the men who held the reins of government in France, and that was—to gain a huge share of the trade of Great Britain. They had monopolized the sugar industry by high protective tariffs and bounties;—they had not only kept out every ounce of British sugar from entering their ports, but they had allowed money from their national exchequer to cripple our market, and they were now going to attack us in ship building. The people engaged in shipping on the Clyde and in Liverpool had sent a memorial to the Sugar Trade Committee, asking for permission to join them in this agitation against foreign export bounties. (Hear, hear.) Those whose interest it was to preserve British labour had several duties now to perform; in the first place they must revert to the old principles of free trade. What they wanted was that wherever a nation had got a natural advantage against another nation, that this natural advantage should be allowed to reign supreme, and that no nation should be allowed to hamper and destroy the natural advantages of another by

export bounties. (Hear.) In their case, this nation had the natural advantage of the growth of sugar and the building of ships. This island was bound round with the sea ; and it only wanted a strong expression of the working classes to tell foreigners that we would not allow the gay Frenchman or the heathen Chinee to inundate our markets without a very strong protest on behalf of the millions whose only hope in this country was free trade to all and State favour to none. There was a very strong feeling in this country against this principle of allowing British industry to be destroyed under the principle of bounties upon export ; and Cobden, Mill, and all those great economists had laid it down that nobody should be allowed to enter the British market except in reliance upon natural advantages. He would point out that if the principles of Mr. Courtney, Sir Louis Mallet, and Mr. Giffen of the Board of Trade, were allowed to reign supreme, the condition of the working men would be very poor by-and-bye. Mr. Kelly concluded by saying that the men who agreed with him in giving a very hearty testimonial to Mr. Ritchie would be the strongest and best Radicals in the country, and the men employed in the woollen trade, the cotton trade, and ship-building, would be the first to put their names to this national testimonial that they were about to present to Mr. Ritchie, because, apart from any question of party politics, they were going to give honour to whom honour was due, and therefore it was with great confidence that he moved the resolution. (Loud cheers.)

The following delegates having warmly supported the resolution, viz.: Mr. Barrett, London Docks; Mr. George Jones, of the Philanthropic Society of Coopers; Mr. Hillman, of the London Coppersmiths' Society; and others, it was carried amid loud applause.

A Committee of the Delegates was appointed to draft the address, and to make arrangements for the public presentation of the testimonial to Mr. Ritchie.

The meeting terminated with a vote of thanks to the Chairman.

THE WORKMEN'S COMMITTEE AND THE LIVERPOOL ELECTION.

DEPUTATIONS TO LORD CLAUD HAMILTON AND MR. PLIMSOLL.

THE SUGAR BOUNTIES.—EMPLOYERS' LIABILITY.

On the Fourth of August, a number of delegates from the two Trade Councils of Liverpool, with some others, waited upon Lord Claud John Hamilton, by appointment, at the Conservative Club, to obtain his views upon the Employers' Liability Bill and the question of sugar bounties given in foreign countries as affecting the home sugar trade. The delegates were Mr. A. Clarke, secretary of the United Trades Council of Liverpool; Mr. John Roberts, president of the Liverpool Anti-Bounty Committee; Mr. Peter Mc.Stay, secretary of the Liverpool Anti-Bounty Committee; Mr. M. Kirkpatrick, of the Shipping Trades Council; Mr. John Fothergill, United Trades Council; Mr. John Cartmell, president of the Ship-joiners' Association; Mr. John Jones, Amalgamated Society of Railway Servants; and Mr. S. Peters, general secretary to the Workmen's National Committee for the Abolition of the Foreign Sugar Bounties. The question of the sugar bounties was fully discussed with Lord George Hamilton, M.P., while the delegates were waiting the return of Lord Claud Hamilton from one of his meetings, and when his lordship returned with Mr. Alderman A. B. Forwood, the arguments used by anti-bounty advocates were repeated. These gentlemen appeared to rely principally upon a statement made before a select committee of the House of Commons by one of the firm of Messrs. Macfie and Co.,—that whereas it had taken twenty years to ruin the loaf sugar trade in this country, the moist sugar trade would be ruined in every refinery in Lancashire after the 1st of October next, on which day the new French bounty law comes into operation.

Lord CLAUD HAMILTON stated that he had given considerable

attention to this question. He was one of those who believed in the old school of free trade, as represented by Cobden, Mill, and others, and not in the new-fangled notions of the political theorists and economists of the present day. He believed that free trade meant equal trade, and, if returned to Parliament, he had no hesitation in saying that he would support a motion for a countervailing duty, believing it to be in the true interests of the country, and in the true interests of free trade. He believed that the moment the Government of this country declared authoritatively to those foreign nations who gave those bounties that the equivalent duty would be imposed in this country, these bounty systems would be abandoned. He was further of opinion that, if some decisive action was not taken immediately by the Government, the bounty system would be extended to other industries, and perhaps with the same effect that they had upon the sugar industry.

Mr. CLARKE next introduced the question of the "insurance clause" in the Employers' Liability Bill, contending that it ought not to be compulsory, because in that case the liability of the employer would be entirely abolished. What the men wanted was that their lives should be spared.

Lord HAMILTON said that he believed insurance was not yet compulsory in the company to which he belonged, but that probably it would be introduced. However, he could not give them an answer then, as he wished to take time to consider the question. He promised them that he should state his views upon the matter at the meeting of the railway servants to-day.

The deputation thanked his Lordship for his courtesy, and then retired.

The delegates subsequently waited on Mr. Plimsoll at the Reform Club, Dale Street, when they entered into a friendly conversation upon the two principal questions which occupy the attention of their order at the present time. After fully discussing the sugar bounty question with Mr. Peters,

Mr. PLIMSOLL stated that he deeply sympathised with the workmen who had been thrown out of employment by the system of

foreign bounties. He believed the system to be a vicious one, and unjust to the British labourer. He mentioned that he knew something of the sugar refineries in Canada being closed some twelve months ago by the same system of United States bounties; but Canada had since then imposed countervailing duties, and the sugar industry of the country had assumed a prosperous position. While not wishing to pledge himself on any question during this election, he, after hearing the debate in the House of Commons, would no doubt be found supporting the working men in this just view of the matter.

Mr. A. CLARKE introduced the "insurance clause," and had only proceeded with a few sentences when

Mr. PLIMSOLL observed that the so-called "insurance clause" was no insurance at all, that it ought never to have been in the bill, and that it was a piece of humbug. He added—It is just like cutting a dog's tail off to feed it.

The conversation here closed, and the working men's representatives expressed themselves highly pleased and gratified at their reception.—*Liverpool Mercury.*

THE PRACTICAL DETERMINATION OF THE VALUE OF THE SUGARS OF COMMERCE.

By HENRY A. MOTT, Jun., Ph.D., E.M.

(Continued from page 483.)

To find out the influence the foots have on the value of sugars, let us take, for example, 100 hogsheads of a muscovado sugar testing 85 per cent.—the foots testing 75 per cent. A hogshead of Muscovado sugar is 36 inches in height, and holds about 1600 lbs. of sugar. If the foot is only four inches, then we will find that about one-ninth of the sugar is foot. The sugar will then stand :—

Sugar, 85 per cent.—1422·23 lb. = 1208·89 lb. cane sugar.

,, 75 „	177·77 „	= 132·23 „ „
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1600·00 „	= 1341·12 „ „
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If all the sugar tested—85 per cent.—we should find

1600 × 85 per cent.	= 1360·00 lb. sugar.
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Actually present	1841·12 „
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Loss cane sugar on one hogshead	18·88 lb.
---------------------------------------	-----------

,, * 100 „	188·80 „
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188·8 lb. of sugar @ 8½ cents	= \$162·84.
-------------------------------	-------------

The loss, then, on 100 hogsheads of sugar—if calculation were not made for four inches of foots—would be 162·84 dols. Supposing the foots to be eight inches, instead of four inches, the loss would be 325·68 dols. This is, therefore, an important factor to consider. It is safe to allow for every inch of foot, in excess, at least one-fortieth of a cent. per lb. So, for four inches extra, one-tenth of a cent. should be allowed. It is necessary to know the per cent. of cane sugar in the dry substance, as of two sugars testing 90 per cent., the one of sugar in the dry substance, the other of the sugar as it is—containing water—the latter sugar would, of course, be the most valuable, as it is easier to remove water than impurities. Again, as sugar is, to a very great extent, hygroscopic, the low test of a sugar may be due to water absorbed by the sugar from the atmosphere. I have known a number of instances where a sugar would test from one to two per cent. lower, if sampled on a damp day, than it would on a clear, dry day. The high test of a sugar may also be due to the evaporation of water in the natural drying of sugar in a warm room. It, therefore, is best to base calculations of value on the cane sugar in the dry substance. It is necessary to consider the per cent. of impurities present, as the amount of sugar it is possible to get out of a given cargo depends on the factor. Of course, the care exercised in refining, etc., etc., exert their influences. Supposing, however, there to be no other elements to consider except the impurities. then, taking a sugar of the following composition :—

Cane sugar	85·0 per cent.
Water	4·0 ,,
Inverted sugar	3·2 ,,
Organic substances	6·1 ,,
Ash	1·7 ,,
	<hr/>
	100·00 ,,

—we will find, then, according to the experience of the best refiners in this country, that, as one per cent. of impurities prevents the crystallization of one per cent. of sugar, we will obtain :—

Cane sugar.....	85·0 per cent.
Less impurities	11·0 ,,
	<hr/>
Crystallizable sugar	74·0 ,,
Molasses	26·0 ,,
	<hr/>
	100·00 ,,

The French method deducts from the per cent. of cane sugar five times the ashes, plus the per cent. of inverted sugar. By this method the problem stands :—

Cane sugar.....	85·0 per cent.
Ashes \times 5 + inverted sugar 1·7 } = 11·7 ,,	
\times 5 + 3·2 = 11·7	<hr/>
Crystallizable sugar	73·8 ,,
Molasses.....	26·7 ,,
	<hr/>
	100·00 ,,

The brand of the sugar makes some difference in value. For example, a centrifugal sugar of the same colour, test, and other factors equivalent, is preferred to the extent of about one-sixteenth to one-eighth of a cent.

For each degree, or per cent. of a centrifugal sugar, one-tenth of a cent. is allowed, so that a centrifugal, testing 90 per cent., worth 9 cents, would be worth 9½ cents, if it tested 95 per cent., other factors remaining the same.

Having ascertained the method to arrive at the value of the sugars of commerce, the way is made clear to the refiner who desires to

purchase, and the way is also made clear to the government for the appraisement of sugar ; that is, if such appraisement is to be made on the intrinsic value of the sugar. That the importation of sugar should afford a source of revenue to the United States, I think all are agreed ; but that such a high rate of duty should be imposed on sugar, that over one-third of the entire revenue should be derived from this source, is extremely unjust and unwarranted, when such commodities as tea and coffee, which partake of the nature of monopolies—being restricted to certain countries—have no duty imposed upon them. It would seem but just to reimpose the duties on the importation of these commodities by which means the duty on sugar could be reduced at least one-third. In 1877 the United States imported 1,584,162,924 lbs. of sugar, costing 81,117,504 dols., and collected between 34,000,000 and 40,000,000 dols. for duty. What then will be the duty on sugar ? There can be no question but that a uniform rate of duty would simplify matters considerably, and would shut out many channels for fraud, as no other factor except weight would have to be ascertained. This system would also be advantageous—provided the duty was so extremely—say one-half cent. a lb. (about 7·00 dols. a hogshead)—when it would be impossible to import *the lowest grades of sugar* from such parts of the world where higher grades and centrifugal sugars are not made. Thus, the market, although having high grades of sugar poured in upon it, would also have, what is also necessary for a refiner—the low grades. It is not probable, however, that Congress would consider any such leap as this, from the present rates. If the duty is to be on the intrinsic value of sugar, then it seems but just that every factor that bears on the value of sugar should be considered. This, however, would entail great labour and cost, and in the end would be unsatisfactory, or at best it could only be approximate.

I think that the problem can be solved, though, by the use of the polariscope alone. First, it will be necessary to state that, owing to variations of sample, the conditions of the atmosphere, etc., etc., variations of one and even two per cent. can occur. This fact, however, by the method I am about to propose, need only to be considered at what I call the boundary lines. The proposition is thus :—

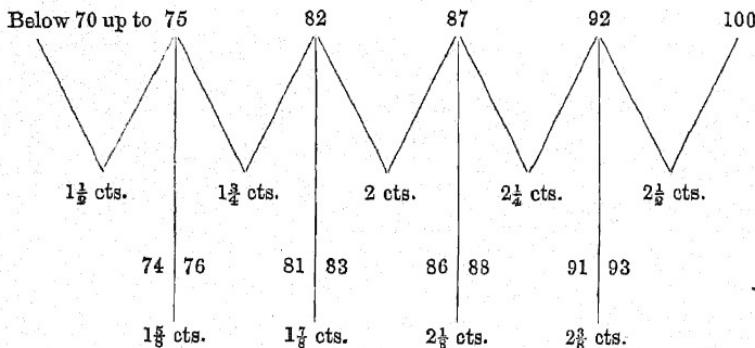
All sugars below 70 per cent., and up to 75 per cent. sugar, shall pay a duty of $1\frac{1}{2}$ cents. (This will bring in a much lower grade of sugar than we now have.)

Sugars between 75 per cent. and 82 per cent. shall pay $1\frac{3}{4}$ cents.
 Sugars between 82 per cent. and 87 per cent. shall pay two cents.
 Sugars between 87 per cent. and 92 per cent. shall pay $2\frac{1}{4}$ cents.
 And sugars between 92 per cent. and 100 per cent. shall pay $2\frac{5}{8}$ cents.

The boundary lines I referred to are the points 75, 82, 87, and 92. *Only these four points* could be called into question, and my idea is that if the government finds a sugar to test, say 87 per cent. and the importer claims it tests only 86·5 per cent., then the duty on such a sugar should neither be two cents nor $2\frac{1}{4}$ cents, but $2\frac{5}{8}$ cents. Again, if the government finds the same sugar 87·5 per cent., and the importer only 86·5 per cent. still the duty will be $2\frac{5}{8}$ cents. This consideration is only necessary to be made at the boundaries, where one per cent. each side should be allowed.

All sugars between the boundaries, which include, of course, the majority, would come in without any further consideration, under the duty given for such boundaries, up to No. 13, Dutch Standard colour.

The scheme may be illustrated as follows:



It might be thought, at first, that new boundaries were being made by this plan, at 74, 76, 81, 83, 86, 88, etc., but such is not the case. These degrees are only the fixed limits through which the real boundaries may fluctuate, owing to the difficulty of deciding the

true per cent. of a sugar by the polariscope, closer than about two per cent. With regard to Dutch Standard, it may be stated that, since the introduction of vacuum pans and centrifugal machines, the Dutch Standard is no standard at all. For open pan sugars it is perfectly reliable, but not for the other methods, which have changed the character of sugar completely. This, of course, applies only to sugars up to No. 13 D. S.; above 13 to 20, the standard is reliable, and colour becomes an important element of consideration.—*Scientific American.*

ON THE USE AND ABUSE OF TEMPER LIME.

Mr. W. Eathorne Gill, in the May number of this magazine, has responded to my remarks in April, and somewhat widened the subject under consideration. Since then we have been favoured with Mr. L. Bellairs' view of the matter, which is, to say the least, not a very favourable one for Mr. Gill's process. Personally, I very much doubt any boiling process giving 50 per cent. more than the lime process, for the simple reason that there is not 50 per cent. loss on a well conducted plantation, nor anything like it: our loss is in getting the juice out of the canes.

Allow me to correct one statement and modify another on page 247.

"I believe the rose tint (on litmus paper) to be essential to a good free sugar." I DON'T: I believe it to be *fatal* to it unless you have some other means than lime of checking the cumulative generation of acidity which is sure to go on, and end in a sticky glutinous mass with a burnt taste, which wont pass muster as sugar in a "sale room."

"Lime is added to cane-juice or to syrup to correct acidity." Our great aim in putting lime in is to PREVENT acidity, and also to correct any *slight* acidity that may be present; but to PREVENT is the great thing, therefore always work your juice very slightly alkaline.

Should your juice, by mishap or neglect, become decidedly acid, dont add lime until you have well boiled it, and got rid of most of

the acetic acid; then add lime continuously. This juice will give you trouble which juice alkaline from the first never does.

I note Mr. Gill's expression of satisfaction at the probability of seeing his process in my hands, and he shall not be disappointed. I think it is to the interest of the planting world generally that assertions such as his should be fully tested, and I am content to give his process a fair trial, according to the method laid down by him, and whatever the result proves to be—whether for or against—to publish it in the *Sugar Cane* for general information, giving a description of the *modus operandi* and the figures, so than anyone can check them over. I can quite understand that the smallest addition of lime may be fatal to his system, as it may prevent the generation of electricity whereby he coagulates his ferment and throws it down in an insoluble form (if I understand his mode of working); and therefore he may rely upon it that none shall be added, and also (as I use a Concretor) that the whole of the juice shall be turned into sugar and none left in the molasses tanks. My crop being off, I do not think it likely I shall be able to test his process before December or January, when I hope to give full particulars to the readers of the *Sugar Cane*.

J. SPENCER HOLLINGS.

THE CHINA AND HONG KONG SUGAR TRADE.

The sugar cane is cultivated on an extensive scale throughout that portion of the mainland of China, southward of Amoy (both along the coast and for a considerable distance inland) and also on the Islands of Formosa and Hainan.

It is estimated that the total production of sugar in China is about 200,000 tons yearly, but the habits of the Chinese and the conditions of trade render it impossible to obtain accurate statistics.

The methods of manufacture are exceedingly rude, while the rooted antipathy of the Chinese to all change, and the fact that planters seldom grow more than a few acres of cane which they rarely manufacture themselves, render the introduction of

improved process exceedingly difficult, if not for the present impossible.

The rollers for crushing the cane are placed vertically, and are either of hard wood or stone, and of the roughest description, while the concentration of the juice is effected in very small open pans.

The "green" sugar when concentrated is placed in earthenware pots, where it is subjected to a claying process.

By far the greater portion of the sugar thus produced is consumed within the Empire of China, though there is a regular export trade to Japan, and recent experience during the great rise in the value of sugar in Europe in 1876, showed the prices would suffice to ensure a large supply to that market.

China not only produces raw sugar, but it is furnished also with two sugar refineries, both in Hong Kong and both under the control of Messrs. Jardine, Matheson & Co., as General Agents; and of Mr. Henry Dickie, as Manager. A third is building at Swatow, and is also in the hands of the same firm.

The China Sugar Refinery, of Hong Kong, which is the property of a limited company, is furnished with all the latest and most improved apparatus for producing white crystals and also loaf and cube sugar, and is capable of refining 120 tons of raw sugar per day. Here, the bags of raw sugar are raised by a steam hoist to the top floor of the main house, where they are unpacked and the sugar allowed to drop through openings in the floor into the "blow ups" upon the floor beneath, where it is mixed with a stream of water from the hot water cistern, and melted. From the "blow ups" the liquor passes, in the usual way, through the "bag filters" placed at a lower level, by which the dirt is removed. It is next filtered through animal charcoal in order to remove the colouring matter,—the "char cisterns" being situated in a separate building. The clear filtered liquor is then drawn to the vacuum pans, where it is boiled into *masse cuite*. This is, in due course, either passed through the "centrifugals" for the production of crystals or put into moulds, liquored, and stoved if loaves are to be made. The cube sugar is manufactured out of crystals by patented machinery.

The drainage from the centrifugals is reboiled in the usual way for the production of medium and lower qualities of sugar, and finally, when no more sugar is to be extracted, the molasses are fermented and made into spirits by means of a "Coffey's" still.

The animal charcoal is manufactured on the premises, the bones being burnt in suitable cast-iron retorts, and then ground to the required size.

The reburning of the charcoal, to renew the purifying power, after use in the filters, is effected in pipe "kilns," similar to those in general use in Scotland. These kilns and the cooling floors connected with them occupy separate buildings adjoining the char filter house.

All the buildings are lighted with gas, and are furnished with water hydrants and hose on every floor in case of fire.

The machinery for this refinery has been principally supplied by Messrs. Rankin & Blackmore, Greenock; and Messrs. Manlove, Alliott & Co., Nottingham.

The Oriental Sugar Refinery, of Hong Kong, is designed for the partial cleansing of raw sugar by means of Weinrich patent centrifugal process. It is at present almost entirely employed in cleansing low sugars, which after this preliminary treatment are completely refined at the China Sugar Refinery. It is capable of treating from 40 to 60 tons of sugar per day; the quantity operated upon being dependant on the quality.

The Swatow Refinery at present being erected in similar design to the Oriental Refinery at Hong Kong. The machinery of both houses was manufactured by Messrs. Manlove, Alliott & Co., of Nottingham, England.

The Hong Kong refineries supply themselves with raw sugar not only from China, but also from the Phillipines Islands, Cochin China, the Straits Settlements, and even from Java.

The raw sugar is usually packed in mat bags, weighing about $1\frac{1}{2}$ picul each, and the refined in double mat bags of much superior quality, containing generally 1 picul each.

Hong Kong, 3rd June, 1880.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

3228. HENRY HARRIS LAKE, of Southampton Buildings, London. *An improved method of and apparatus for drying sugar or other materials.* (A communication from E. E. Quimby, of Orange, New Jersey, U.S.A.)

3264. HENRY SPRINGMANN, of 109, Gneisenaustrasse, Berlin, Prussia. *Improvements in the method of filtering as applied in refining sugar.* (A communication from Georg F. Meyer, of Brunswick.)

ABRIDGMENT.

38. SAMUEL HENRY JOHNSON, F.C.S., of Stratford, Essex. *Improvements in filter-presses.* This invention relates to the fixing of the filter cloths on to the plates. When a pair of cloths are used one on each side of the plate they are hung on hooks on the plate, instead of being tied together at the top as usual. These hooks which pass through eyslets in the cloths are not fixed but are adjustable by means of screws or otherwise in order to allow for shrinking of the cloths, and prevent the consequent creasing of the same. When the covering for both sides of the plates is in one piece hung over the top, and provided with holes to correspond with the central hole in the plate, in order to form a tight joint at the centre the inventor employs a short pipe or collar of peculiar construction. This collar is formed with two external flanges, one at one end thereof, and one near the other end, but leaving a short tube projecting therefrom. The cloth being hung over the first plate in the usual manner the tubular projection of one of these collars is passed through the hole in the cloth and into the hole in the plate which fits over it and holds it in position. The next plate is pushed against it, and another flanged collar inserted in the central hole thereof, and so on throughout the series, thus ensuring the joints round the feed holes of the plates, and forming a very strong stay for the centre of the plates when screwed together. Holes are made between the flanges of each collar to allow the fluid to pass freely between the filtering plates.

CANADIAN.

11,118. DUNCAN McLELLAN, of Charlottenburg, Ontario. *A sap evaporator.*

11,159. CHARLES H. HERSEY, of Boston, Massachusetts. *Improvements on sugar moulding machines.*

AMERICAN.

230,131. WILLIAM JASPER and STEPHEN BOUSHY, of San Francisco, California. *Machine for the manufacture of cube-sugar.* This machine is constructed as follows: A hopper is provided with beaters and a distributing blade, which delivers the sugar to be pressed, evenly on to a plate which then passes on to the pressing mechanism. The cutters or blades first separate the sugar slab into cubes, and plungers then descend and compress them. The cutters then rise, and the cubes are held down on to the plate by the plungers, which, are in their turn lifted by the ascending cutter plate. The sugar slab is then caused to move on until the last cut made by the former operation is exactly below the first blade of the cutters, which again descend and form another series of cubes without leaving any waste or surplus sugar on the slabs between each series. Immediately above the slide track for the plates, and in a line with the vertical sides of the sugar slabs are fixed blades, which, as the cubes are drawn past, trim off the burr left by the cutters along the outside row of cubes on the plates. After the cutters have been raised an intermittently acting brush and wiper comes forward to remove any particles of sugar adhering to the blades. They are then carried back to their former position, and the cutters are free to descend and form the next series of cubes.

230,675. OSCAR B. STILLMAN, of Brookline, Massachusetts. *Mechanism for making cube-sugar.* This invention relates to the means of moving forward the plates on which the cubes are formed, and consists of an endless travelling chain beneath each side of the plates, furnished at suitable distances with lugs or projections, which, engaging in corresponding notches in the plates draw the latter forward. These notches being cut through the plates it will be evident that either face of the plates may be used uppermost, and thus the plates will not be liable to be bent by constant pressure on one face thereof.

SUGAR STATISTICS—GREAT BRITAIN.

To AUG. 14TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	99 ..	82	218 ..	221	193 ..	185
Liverpool ..	39 ..	68	147 ..	192	151 ..	149
Bristol	4 ..	6	36 ..	40	34 ..	35
Clyde	54 ..	71	173 ..	198	152 ..	158
Total ..	196	227	574	651	530	527
Decrease..	31		Decrease..	77	Increase..	3

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST JULY, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other emporia.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
204	84	24	23	3	338	362	326

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST JULY, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other emporia.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
964	318	30	294	195	1801	1814	1659

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1879-80.	1878-79.	1877-78.	1876-77.
	Tons.	Tons.	Tons.	Tons.
France	275,000 ..	432,636 ..	398,132 ..	243,295
Germany (Zollverein)	410,000 ..	420,684 ..	383,828 ..	291,204
Austro-Hungary	375,000 ..	405,907 ..	330,792 ..	247,175
Russia and Poland	225,000 ..	215,000 ..	220,000 ..	250,000
Belgium	55,000 ..	69,926 ..	63,075 ..	44,467
Holland and other Countries.....	25,000 ..	30,000 ..	25,000 ..	25,000
Total,.....	<u>1,365,000</u>	<u>1,574,158</u>	<u>1,420,827</u>	<u>1,101,141</u>

STATE AND PROSPECTS OF THE SUGAR MARKET.

After the extensive transactions of the last month there was a pause in the sugar market, and during the early and middle part of the month a very dull tone prevailed.

Towards the latter end of the month there was a sharp decline of 2s. per cwt. in Paris loaves, which has quite unsettled the trade, and business has been almost entirely from hand to mouth.

Transactions are pretty much confined to West India, at prices against the sellers.

The imports in 1880, compared with those of 1879, show a decrease of 77,100 tons, against a decrease of 64,000 tons shown last month.

The deliveries, which last month showed an increase of 3800 tons, now exceed those of 1879 by 2400 tons.

The stocks of sugar on the 14th August were 31,000 tons less than those of the same date last year, and 44,500 tons more than on the 1st January, 1880.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 22s. 6d., to 23s., against 23s. 6d. to 24s.; good to fine grocery, 23s. 6d. to 25s. 6d., against 24s. 6d. to 26s. 6d.; Martinique crystals, 26s. 6d. to 27s. 6d., against 27s. to 28s.; No. 12 Havana, 24s. to 24s. 6d., against 25s. 6d. to 26s.; fair to good refining Cuba Muscovados, 22s. 6d. to 23s., against 23s. 6d. to 24s.; middling to good brown Bahia, 19s. to 19s. 6d., against 20s. to 20s. 6d.; good to fine Pernambuco, 19s. 6d. to 20s. 6d., against 20s. 6d. to 21s. 6d.; Paris loaves, 28s. to 29s., against 30s. 6d. to 31s.

THE SUGAR CANE.

No. 135.

OCTOBER 1, 1880.

VOL. XII.

 The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

THE MINORITY REPORT OF THE SELECT COMMITTEE ON SUGAR INDUSTRIES.

Throughout the sittings of the Select Committee on Sugar Industries it has been interesting to watch the action of the minority, who, under cover of Liberal principles and the doctrines of Free Trade, have shown a persistent hostility to the representatives of the West Indian and sugar refining interests, and a constant desire—like advocates retained for the defence—to distort evidence, misrepresent or ignore facts, and press illogical deductions in the face of repeated and most conclusive refutation. No matter how completely a witness might demonstrate his knowledge of Free Trade principles, and his complete acceptance of them, his evidence was constantly regarded by certain champions of the Liberal party on the Committee as an insidious attempt to undermine and destroy them. This is party spirit in its worst aspect. There was no reason why the subject should have been dealt with as a party question. It is quite an accident that the member who took the question up in the first instance happened to be on the Conservative side of the House. But Mr. Ritchie having been the person to undertake what he has with so much ability carried out, the subject immediately became a red rag in the eyes of certain Liberal members. An off-hand view, like that taken by Mr. Forster in the debate of last year—apparently on the spur of the moment—is so easy and so likely to go down with that large majority of mankind who don't care to think, that its adoption by

popularity hunters in the House and leader writers in the press is not surprising. This was all very well while the matter was being treated superficially, but, after a careful sifting of the question, the off-hand style of hostility has had to be somewhat modified, and has given place, in the press, to persistent and diligent misstatements, and to a good deal of strong and bitter language. We have already touched on this phase of the controversy, and propose to return to it as soon as the present acute attack of fever in the press has somewhat subsided, when the interesting collection of articles—apparently mostly from the pen of Mr. Giffen—may be quietly, completely, and properly digested.

But a much more important examination than that of ephemeral leading articles has now to be undertaken. The small knot of obstructives, consisting of Lord F. Cavendish, Mr. Courtney, and Mr. Brown, have now had the opportunity of formulating their views in the shape of a report, which they have induced Mr. Norwood and Mr. Collins to join them in supporting. Some such definite statement of opinion has long been desired, their views having hitherto been expressed principally in a negative form. What then does this minority report amount to. It begins with a good deal of loose and incorrect technical detail, such, for instance, as saying that “the drawback” on raw sugar is “assessed on the supposition” that less than the real amount is produced; that drawback is given on the density of the juice; that duty is no longer assessed in Austria on the weight of the beetroot; that in 1877 more than 70,000 tons of raw and refined sugar were exported from Austria, whereas the quantity exported nearly doubled that amount; that in France the drawback on refined sugar is given on the estimated amount supposed to be made from the raw; that the yield of refined sugar from raw sugar governs the drawback; that the system of drawbacks which prevails in the United States does not allow of bounties; that the greater part of the imported raw sugar is subject to a very heavy tax.

Passing from these technical inaccuracies to the essential parts of the question, we find that the minority report states the amount of the French bounty in the following brief and perfunctory manner:—“15. The amount lost to the French revenue is

estimated at very different sums ; varying from £94,000 (M. Léon Say), to £240,000 (M. Pouyer Quertier)."

This is a very distinct case of suppression of the truth, considerably aggravated by the fact that M. Say officially contradicted and disproved the statement here quoted, which was simply made in conversation and never properly authenticated. Let us compare this inaccurate and misleading paragraph of the minority report with the statement in the report of the Select Committee as to the cardinal point in the whole question. The bounty gradually increased up to 1875, when legislative measures were adopted for its reduction. This is well illustrated by the various estimates made at different periods. These estimates are stated in detail in the report of the Committee, with full reference to the evidence in each case. They are as follows :—1862-3, £180,000 (Fould); 1872, £320,000 (Rouget and Jéronnez); 1872, £447,000, 1873, £507,000, (Hittorff); 1872, £480,000 (Ozenne); 1874, £800,000 (Pouyer Quertier, Dupont); 1875, £440,000, 1876, £400,000, 1877, £320,000 (Jacquemart); 1878, £340,000 (Fouquet); 1878, £440,000 (De Mot); 1878, £94,000, 1878, £154,000 (Léon Say).

Finally, the preamble to the new French law shows that 272,000 tons of refined sugar per week were really consumed in France in 1878, on which the refiner had paid duty at the rate of only 68 fr. 86 c. per 100 kil., while he had received from the consumer 75 fr. per 100 kil., thus obtaining a bounty of 6 fr. 14 c. per 100 kil., or a total gain of £652,800 per annum.

The statement respecting the Dutch bounty is equally unsatisfactory and misleading. It is many years ago since the difference, between actual and estimated yield, was supposed by the official mind to be only 5 per cent. Evidence was given to the Committee showing how much bounty the Dutch refiners can now obtain by the use of sugars of high yield and low classification. It was also shown that the use of such sugar had increased, since Mr. Toe Water's estimate in 1876, from 17 per cent. to 85 per cent. of the total quantity refined, and that the bounty must therefore have increased at the same rate. There is no doubt that, at the present time, the Dutch refiners can and do undersell all competitors, and that their exportations are therefore increasing rapidly.

In the United States the system of assessment of duty on raw sugar is exactly the same as in Holland, and formerly in France, and must therefore give rise to precisely the same opportunities for obtaining an export bounty on refined. The minority report says that it is "positively stated" that the system does not allow of bounties, but this is founded solely on an erroneous remark in the report of the Secretary to our legation at Washington.

The minority report attempts to make it appear that negotiations originated in a complaint from France that British refiners received a bounty. This is not the case, and it has been shown in the evidence that the British Delegates at the first Conference proved that British refiners, instead of receiving a bounty, were actually at a disadvantage.

The report endeavours, as had been frequently done by the minority in taking the evidence, to set off the refiners against the raw sugar producers, and to make it appear that their interests in this matter must necessarily be opposed. It was clearly shown in evidence that this is not the case, that a bounty on raw sugar is no advantage to the refiner, and that it would be greatly to his injury to lose the natural sources of supply. The minority report, nevertheless, repeats this erroneous idea, completely ignoring the evidence by which it was disposed of.

In dealing with the injury sustained by cane sugar producers, the minority report first compares production in 1878 with production in 1853. As the abnormal stimulation of beetroot sugar production by export bounties did not begin till long after then, this comparison has no bearing on the case. The report, however, gives subsequently the figures for 1878 as compared with 1873, from which it appears that the production of cane sugar has actually decreased in that period from 1,841,000 tons in 1873 to 1,699,000 tons in 1878. This decrease would have been larger but for an unusually large crop in Mauritius in 1878. The minority report, therefore, proves by its own figures that the production of cane sugar has not only been checked but even supplanted by bounty-fed beetroot sugar.

As to the fall in the price of sugar, our opponents desire to make

it appear that there are other causes for it than export bounties. The minority report speaks of the depression of trade as one such cause. But the only way in which the depression of trade can affect prices is by reducing consumption, and in the case of sugar it is a fact that consumption has gone on increasing not only steadily but rapidly. This is, no doubt, in some part owing to the extremely low prices brought about by the export bounties. The report speaks of a fall in value, as great if not greater, which has occurred in other articles of consumption. But it was shown in evidence that an increase in consumption, and decrease in value, had taken place concurrently in the case of sugar which had no parallel in any other commodity. The report says that competition with sugar not bounty-fed, the production of which has also increased, is another cause of the fall in price. But the report gives the production of sugar not bounty-fed, with which the produce of British posessions has had to compete, from which it appears that such sugars, instead of increasing, had decreased from 1,478,000 tons in 1873 to 1,305,000 tons in 1878. Evidence has also shown that the production of beetroot sugar in France, where it receives no bounty, is being seriously curtailed by the bounties given in other European countries, and that, if these bounties continue, France will soon only produce enough for her home consumption. This entirely disposes of the argument contained in paragraphs 45 to 47 of the minority report.

Paragraph 50 is perhaps one of the most erroneous in the report. In it the minority of the Committee endeavour to establish another "of the causes which render it difficult for the West Indian sugar to compete with sugar of a higher class." This is, according to Mr. Brown, the reporter, the fact "that there is no country in Europe in which any attempt is made to graduate the sugar duties, as was formerly the case in this country." This is one of many instances, in this minority report, of the statements of Sir Louis Mallet and Mr. Giffen being adopted as correct, in total disregard of the fact that they were immediately disproved in cross examination. The assertion on which this paragraph is founded is to be found in Sir Louis Mallet's evidence, at page 265 of the blue book,

question 5694, where he says that "there is no country in which any attempt is made at a graduation of the duties in the way which formerly existed in this country." At page 304, questions 6409 to 6423, Sir Louis Mallet admits that he was not aware that a complete graduation of the duties exists in Belgium and Holland, and also in America, and that if a graduated scale does exist his previous statement would not hold good. He, however, shifts his ground and suggests that the abolition of the graduated scale in this country may have been detrimental to the West Indian interest. His original statement was that the absence of a graduated scale abroad,—that is, the existence of uniform or nearly uniform duties,—had injured the West Indies. Having been told that graduated scales as extensive as our own were generally adopted abroad, he falls back on the fact that this country has abolished its sugar duty, forgetting that the absence of duty secures much more certainly the free and unrestricted entry of all classes of sugar than any classified scale, however elaborate. In point of fact France, as well as Belgium, Holland, and the United States, has practically a classified scale, in every way as extensive,—and indeed, since 1875, even more so,—than that in force in this country. All this is completely ignored by the minority of the Select Committee.

The last cause to which the minority report attributes the fall in price is the competition of cane-growing countries among themselves. But the only complaint is the sale of sugar below cost price by means of export bounties. This has brought about an increase of 300,000 tons in the production of bounty-fed sugar in the last six years, while cane sugar has decreased in that period, as shown by the figures quoted in the report, 150,000 tons. In the face of these facts the minority gravely attribute the ruinous prices of 1876 and 1879 to "the competition of cane-growing countries among themselves."

The discussion in the report as to the amount of capital and labour employed in the refining industry is quite unnecessary, for the minority do not deny that the only complaint ever made is perfectly well founded, namely, that the loaf sugar production in

this country has, in the words of Sir Louis Mallet, undergone a "progressive process of extinction." They endeavour, however, to get rid of this cardinal point by pointing out that the new French law will reduce the bounty, quite ignoring the fact established in evidence, that the new French law threatens the hitherto "fairly prosperous" trade of moist refined sugar with the same "progressive process of extinction."

The report passes somewhat rapidly over the point so much relied on by the minority, namely, the supposed benefit of the foreign bounties to the British consumer. It regards the increased consumption and the increased imports of foreign refined sugar as a set-off against "whatever may have been the loss in late years to the sugar refiners or planters," and couples the annual consumption of 50lbs. per head with the estimated benefit to the consumer of the foreign bounty of one farthing a pound. It would appear from this that the minority attribute the increased consumption to the low prices brought about by the bounty, though they had previously attributed the low prices to the depression of trade, *i.e.*, decreased consumption. They "feel, however, that whatever may have been the loss in late years to the sugar refiners or planters, the increased consumption of sugar in the United Kingdom has been very striking." This increased consumption, and the increased imports of foreign refined sugar, had been cited by their witness, Sir Louis Mallet, as a curious proof that sugar refiners and planters were suffering no loss, and yet they desire to show that this increase is coupled with a gain to the consumer of a farthing a pound, two-thirds of which gain must, as shown in evidence, come out of the pockets of those who receive no bounty.

The minority report mentions incidentally that the rapid increase in consumption, on which it congratulates the country, received recently a violent check, falling off in one year to the extent of 75,000 tons, but it does not mention that this arose from a sudden reduction in the bounty-fed supplies, and a consequent rise of fifty per cent in the cost of sugar.

The minority report now passes to the question of a remedy for bounty-fed competition. It deals with the proposal of a

countervail duty by quoting what it calls "the broad principle enunciated in the Treasury letter" of 1876, which said that if the Government were, in the present instance, to act on the doctrine that fiscal measures should be adopted for other than fiscal objects, it would soon be called upon to do so in other cases also. It is evident that this "broad principle" is merely a confusion of ideas. It is absurd to suppose that a duty to restore equality would justify a demand for a duty which would destroy equality; or, that a duty which would secure to the consumer the benefit of the natural sources of production would justify a demand for a duty which would deprive the consumer of that benefit. And yet if the Treasury letter means anything it means that. Mr. Walpole, in a report to the Board of Customs, points out, in reference to this letter, that if the commercial policy of this country is based on free trade principles it should be applied in such a way as not, under any circumstances, to preclude British industry from its benefits; and that it was never intended that its effect should be to debar the British producer from competing on equal terms with the foreigner even in the home market.

It is a very remarkable fact, after all the outcry which has been made against the proposal of a duty to countervail a bounty, that the minority report makes no other attempt to deal with the principle of such a measure, and indeed accepts "the abstract right to put on a duty," whatever that may mean, but goes off immediately on a side issue and falls foul of the system of refining in bond. It then returns to other objections to a countervailing duty, namely, that it would raise the price of sugar, injure the refiners, break the treaties, and give rise to Custom house difficulties. The minority declare that "to take a step which would raise the cost of sugar in order to support this trade and to benefit the West Indies would be a most unprecedented step." If so, then the continuous effort during eighteen years to obtain the abolition of the bounties, also constitutes an unprecedented step, since the abolition of the bounties would have precisely the same effect on the price of sugar as the countervailing of them by a duty. They then argue that abolition of bounties would injure the refiner by diverting

sugar elsewhere and raising the price of the raw material. The exact reverse is the case. The natural sources of supply would be restored to him, no longer impeded by the artificial bounty-fed supply. Whatever change of price might take place in raw sugar would apply equally to all his competitors, and therefore would in no way affect the margin between raw and refined, while the abolition of the bounty on refined sugar in France, Holland, Austria, Germany, and the United States would enable him once more to obtain the natural price for his produce, restore to him freedom of competition on his own markets and give him his natural share of the exaggerated export trade now enjoyed by those countries.

As to the favoured nation clause in our commercial treaties, the minority of the Select Committee consider that the interpretation of those treaties, as meaning equality of treatment under similar conditions, "would be against the broad principle of the clause, which it is our interest to maintain." This is an extraordinary statement, because its only meaning can be, first, that "the broad principle" of the most favoured nation clause is equality of treatment under dissimilar conditions, and, secondly, that it is our interest to maintain so unjust a condition. This is, of course, in exact opposition to the views expressed by the leading statesmen on both sides of the House during the debates on the Cattle Diseases Bill, to which the attention of the Committee had been repeatedly drawn in the course of the evidence. The *Spectator*, in a recent article on the question says, in direct contradiction to this extraordinary opinion, that "clearly we ought not to be obliged, by granting a favoured nation clause, to treat nations alike under totally unlike circumstances, for that really means treating them not equally but unequally." It therefore heartily agrees with the report of the Committee, that we should, in reviewing our commercial treaties, provide against any such construction of the favoured nation clause.

Lastly, we come to the special feature of the minority report, which is the reproduction of Sir Louis Mallet's and Mr. Giffen's theory—that if it is right to countervail a bounty by a duty, it would be right to countervail a duty by a bounty. · It seems

incomprehensible, after the complete exposure, in cross examination, of the fallacy and patent absurdity of drawing a parallel between two cases so diametrically opposed in every respect, how five Members,* who had carefully listened to the evidence, could possibly reassert, with the calm assurance of apparently undoubting conviction, so strange and paradoxical a theory. As pointed out in the report adopted by the Committee, the effects of the two evils, and of the remedies, are so entirely different that every reason in favour of the one course constitutes an argument against the other. This is also very clearly shown in the article in the *Spectator*, already referred to.

The minority conclude by saying that they "cannot recommend that any duty should be levied by way of protection or otherwise to the class engaged in the business of refining sugar in this country." This is a curious way of bringing in the word protection, which becomes still more ambiguous when coupled with the phrase, "or otherwise." No attempt is made in the report to show that a duty to countervail a bounty would be what is commonly called "protection"; but the minority no doubt considered it necessary that the word should appear, and we are not surprised to find it in a prominent position in the concluding paragraph, however unjustifiable the use of such a word may be; what we cannot understand is the meaning or object of those mysterious words "or otherwise." There are many curiosities in this remarkable document but nothing so curiously meaningless as this short concluding paragraph, which the minority introduce as "reviewing the whole question."

THE SUGAR CROP IN CUBA.

A correspondent, writing from Matanzas, on the 3rd ult. (September), says:—The whole Cuban crop this past season reaches, according to carefully-prepared statistics, 545,000 tons, against 680,000 in the previous year. To Europe our exports have only been 40,000 tons, against 130,000 last year, the balance going almost entirely to the United States. Our fields look promising, and, should no unforeseen accident happen, planters estimate the coming crop at 10 per cent. or so over the past one.

* Mr. Brown, Mr. Norwood, Lord Frederick Cavendish, Mr. Collins, and Mr. Courtney.

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(Concluded from page 464.)

Taking it for granted, however, that 25 per cent. of the loaf sugar exported consists of this class of sugar, it is evident, as pointed out by Mr. Giffen, that in considering the bounty on sugar entered for temporary admission, the bounty thus obtained must not be added, as in using the *poudres blanches* a corresponding quantity of that entered for temporary admission is displaced.

A bounty, it is stated, is also obtained by the incorrectness of the co-efficients 2 and 5, but M. Say calculates nothing for this. It appears, however, from a report made to the Minister of Agriculture and Commerce on the process of saccharimetry and the yield of raw sugars in refining, by M. Aimé Girard, as reporter of a Commission appointed for the purpose in 1876, that the figure 2 taken as the co-efficient for the glucose was adopted, not because science demonstrated this to be the correct co-efficient, but because it was the figure adopted in commercial usage; and with reference to the co-efficient 5, for the ashes, the report says, "In the opinion of all competent persons this figure is too high, and leaves the refiner too large a margin." The report then goes on to suggest the adoption of the figure 4, instead of 5, as the co-efficient for the ashes. According, however, to M. Georges, the President of the Central Committee of Sugar Manufacturers, in his evidence before the Commission on the General Customs Tariff, the co-efficient for ashes should be 3 at the most.

The new French law, as introduced, recognised the incorrectness of the co-efficients 2 and 5 by altering them to 1 and 4, but the Bill, as amended, has fixed the co-efficients at 2 and 4.

M. Fouquet, in his evidence, while expressing himself unable to estimate the amount of bounty obtained by the incorrectness of the co-efficients with any exactness, considered that it might fairly be taken at 2,500,000 francs, an opinion which was shared by another French witness, M. Léon de Mot.

There remains, then, the bounty obtained by the falsification of samples and the incorrectness of analysis, which, notwithstanding the great care evidently taken by the French Government, it would seem to be almost impossible to prevent in any system of analysis, however careful. On this subject Mr. Martineau states, "In addition to the falsification of samples, there is another disturbing cause with regard to the assessment by analysis, and that is that the analysis might be incorrect; and we have heard of recent cases where the official analysis has actually been lower than the commercial analysis, instead of being, as it ought to have been, rather higher, because we know as a fact that the system of analysis adopted in the official laboratories is a system which ought to arrive at a rather higher yield than the system adopted in the commercial laboratories." A confirmation of this is found in a statement made in the *Journal des Fabricants de Sucre*, by a raw sugar manufacturer, and forwarded by Mr. Martineau to the Marquis of Salisbury on the 7th of February, 1879, as follows, "My first lots, analysed by the Excise for classification, have always given less than the commercial analysis by a degree-and-a-half to two degrees, but I now have 200 sacks three degrees and a-half less."

What may be the amount of the bounty obtained in this way it is manifestly impossible to calculate.

As to the present total amount of the bounty, your Committee have now before them an authoritative statement by the French Government.

In the *Exposé des Motifs* of the new French law it is shown, by a calculation of the excess yield obtained by the refiners in 1878, that the actual duty received that year has only been at the rate of 68 francs 86 centimes per 100 kilogrammes of refined sugar, instead of the special duty of 73 francs 32 centimes. The *Exposé des Motifs* goes on to say, "On referring to the market prices of "the Bourse, it is seen that for a considerable period the price of "refined sugar delivered into consumption exceeds by 75 francs "the cost of the same sugar sold for exportation. This figure, "which represents the price of the certificates of exportation, and

"which is also the expression of the duty borne by the consumer, exceeds by about 2 francs the special tax on refined sugar (73fr. 32c.), and by 6 francs the average duty really received (68fr. 86c.)" The bounty, by this method of calculation, is shown to be at the rate of 48s. per ton. Calculating, however, the excess yield on export, given in another part of the *Exposé des Motifs*, namely, 10,950 tons, the bounty would, at 73 francs 32 cents. per 100 kilos., amount to £316,000, or 35s. per ton, or at 75 francs per 100 kilos, £328,000, or 36s. per ton.

The new French law will materially reduce the bounty obtained by the refiner. The mere reduction of the duty, supposing the excess yield to remain unaffected, would be a considerable reduction of the bounty, but in addition to the reduction of the duty provision is made for the alteration of the incorrect co-efficients, and the classes heretofore existing are abolished. The effect of this will be to prevent the refiner obtaining an excess yield by using the highest sugars in the various classes.

Your Committee desire, however, to draw the attention of the Government to the representations made by the Chairman of the British Sugar Refiners' Committee, in letters addressed to the Foreign Office, on the 16th June and the 28th July, 1880, and by Mr. Martineau, as to the effect which they state the new law will have upon the moist sugar trade, as any application of the bounty system to this description of refined sugar would be most mischievous.

AUSTRIA.

In Austria the duty is levied, not directly on the sugar, but on the beet-root. A certain quantity, it is estimated, is worked in each sugar factory in a given time, and it is upon this estimate the duty is assessed.

The improvement in culture of the beet, in the pressing of the juice, and in the making of the machinery, at one time combined to enable the manufacturer to produce twice as much sugar as the estimated yield on which he pays duty. To such an extent was this carried that in the year 1875-6 the State actually paid 135,566 florins more in drawback than it received as excise due, and

whereas in 1863 the State received from 139 manufactories a net duty of 7,651,033 florins; in 1877, from 231 manufactories, it received a nett duty of 396,214 florins.

In 1878 a Bill became law the principle of which was the securing to the public Treasury a fixed minimum revenue, retaining the existing mode of estimating the excise duty. This law is described by Mr. Jerningham as being, if carefully weighed, only a third incentive towards increased production without being actually a gain to the Treasury. M. Jacquemart wrote, in April, 1879, that the tendency of this law was to diminish bounties, but not to make them disappear, and that there would always be a grave defect in the Austrian system.

In 1879-80, by a decree of the 23rd May, 1879, the yield for duty was raised from 1,000 to 1,800 kilogrammes, and the minimum revenue was, according to the law of 1878, raised to 6,000,000 florins. This minimum will be augmented each year by 500,000 florins until it reaches a net total of 10,500,000 florins. Notwithstanding this, however, M. Jacquemart shows that the bounty received in 1879-80 was not sensibly less than in 1878-9.

The amount of the export bounty, as estimated by M. Jacquemart, and adopted by Mr. Giffen, was, in 1878-9, 8 francs 75 cents per 100 kilos. in gold on raw sugar, and 11 francs 04 cents per 100 kilos. on refined, or 70s. per ton on raw and 88s. per ton on refined, and in 1879-80 it was 8 francs 40 cents per 100 kilos. on raw, and 10 francs 63 cents per 100 kilos. on refined, or 67s. per ton on raw and 85s. per ton on refined.

The exports have risen from 26,400 tons of raw and 29,993 tons of refined in 1875, to 107,835 tons of raw and 74,915 tons of refined in 1879, and during the nine months from August 1879 to April 1880 the figures are 130,657 tons of raw and 46,331 tons refined.

The new Austrian law, which has raised the net minimum revenue for 1880-1 to 10,000,000 florins, to be augmented annually by 400,000 florins until the amount reaches 12,000,000 florins, and which has also, in other respects, materially altered the mode of levying the duty, ought to reduce the bounty, but former expe-

rience shows that new laws have resulted in fresh expedients, so that the bounty has not been materially reduced, and so long as the present system is retained a satisfactory settlement of the question cannot be arrived at.

It would appear from a Paper handed in by Mr. Kennedy, giving an account of a debate in the Austrian Reichsrath on the 13th May, 1880, that the Austrian Chamber of Deputies had arrived at the conclusion that steps should be taken to put an end to the existing bounties, and had passed resolutions as follows :—

(1.) That it should be endeavoured to obtain the removal of the bounties now existing in other countries on the exportation of sugar by international negotiations.

(2.) That a project of law should be presented, if possible, in 1881, to regulate the taxation of beetroot sugar in Austria-Hungary, according to the quantity of the produce, commencing from the manufacturing period of 1886-87.

(3.) The Government is called upon to take into serious consideration the question whether it would not be desirable to deal criminally with cases of heavy frauds upon the revenue.

It would thus appear that the Austrian Chamber of Deputies considered it desirable to bring about an international agreement for the removal of bounties.

GERMANY.

In Germany the duty is calculated on the estimated quantity of sugar which may be extracted from a certain weight of beetroot, it being calculated that $12\frac{1}{2}$ cwt. of beets are required to produce 1 cwt. of raw sugar ; whereas Sir John Walsham states that it is proved to be the case, in consequence of the great improvements that have taken place in extracting the sap of the beet, that 1 cwt. of sugar can be made out of 10.82 cwt. of beets. The result of this is that the manufacturer, instead of paying 10 marks, the excise duty on 1 cwt. of raw sugar, really only pays 8 marks.

HOLLAND.

In Holland the raw sugar imported is charged on the estimated yield of refined according to the colour standards, and yields

established under the Convention of 1864; but it is admitted that the actual yield of refined sugar is in excess of the yield established at Cologne, and this excess yield constitutes a bounty.

The duty on home-grown beetroot sugar is estimated on the density of the juice which is extracted from the beetroot, and in the case of the estimate being too low, and therefore not indicating the full quantity of sugar produced, a bounty is obtained on export by a return of duty never paid.

Mr. Toe Water, a leading official of the Dutch Customs, estimates the bounty at 1,800,000 florins, or £150,000 in 1876, and in a letter from the Chairman of the British Sugar Refiners' Committee of the 17th June, 1880, to Lord Granville, it is pointed out that as the use of the sugar from which the largest amount of bounty is received has risen from 16·89 per cent. in 1876, when Mr. Toe Water made his estimate of the bounty, to 85·40 per cent. in 1880, a corresponding increase in the bounty has no doubt followed.

A new law on sugar has recently passed through the Dutch Chambers, which, however, still retains the objectionable classification by colour.

BELGIUM.

The system in Belgium is similar to that in Holland: the raw sugar imported is charged duty on the estimated yield of refined, and the duty on home-grown sugar is estimated on the volume and density of the juice, but a minimum quarterly income of 1,500,000 francs is fixed.

The bounty in Belgium has been estimated by Sir H. Barron at £169,640 for 1876, but Mr. Sandford does not agree with this estimate; and, while agreeing that a bounty does exist, he expresses himself unable to fix the amount.

M. Fouquet, in his evidence, estimates the amount of the Belgian bounty at 12,000,000 francs on an export of 100,000 tons, a statement denied by the Belgian sugar manufacturers, in a letter addressed by them to the chairman.

The total bounty on the export of refined sugar must undoubtedly be insignificant as the export is exceedingly small, only

amounting to 3,700 tons in 1878. The export of raw amounted to 58,000 tons in 1878, against 47,000 tons in 1877, and 58,000 tons in 1876.

Mr Sandford is of opinion that the bounty on raw sugar would disappear if the basis of taxation in factories were raised from 1,500 to 1,600 grammes. This addition of 100 grammes, he says, corresponds to one-fifteenth of the present basis, and would amount to something like 5,000,000 kilogrammes, paying 2,250,000 francs duty. Assuming this to be correct, the bounty on an export of 58,000 tons would amount to about 29s. per ton.

UNITED STATES.

The system of assessment, according to the Dutch standard of colour, is adopted in the United States, and, although several witnesses have stated their belief that a bounty is obtained on the export of loaf sugar from the United States, there seems to be a general agreement that every effort is made by the American Government to prevent bounties being obtained.

Mr. Drummond, in his report on the subject, seems to think that no bounty is obtained on export, but, at the same time, states that the Secretary of the Treasury, in his reports to Congress for 1877 and 1878, expressed the opinion that the Dutch standard is an unsatisfactory basis for the assessment of duty, and that some change in the mode of collection should be made, with a view of excluding the temptation either to colour sugar for the purpose of reducing the duty, or to commit frauds by means of sampling and classification.

Sugar is grown in Louisiana, and is not subject to duty. On exporting, the refiner, before receiving a drawback, has to declare that the sugar is not made from that grown in the United States. It is manifest that such a provision of the law must be very liable to evasion, and under such circumstances it is impossible to state whether or not a bounty is obtained on the export of sugar by this means.

The total amount of drawbacks paid in the United States on refined sugar exported was, in the year 1877, 2,253,959 dollars, of

which 918,662 was for exports to Canada, and, in 1878, the total amount paid was 2,636,979 dollars.

ITALY.

No evidence has been given before your Committee on the question of bounties on export from Italy, but a report on the subject of the taxation of sugar in Italy has been received from Mr. Macdonell, and will be found in the Appendix. In it he states that a committee of the Chamber recommended "that no time "should be lost by the Government in entering into negotiations "with other states interested in the sugar question, with a view "to taking measures for guarding against the conversion of draw- "backs into bounties."

RUSSIA.

A report has also been received on the drawbacks, &c., on Russian manufactured sugar from Mr. Plunkett, entering into great detail, but no evidence has been given or any complaints made on the subject before your Committee.

The export of sugar in 1876 was 499,462 poods, equal to about 7850 tons; in 1877 it rose to 3,891,897 poods, equal to 62,500 tons; and in 1878 it fell to 301,068 Poods, equal to 4,884 tons. The rise in the exports in 1877 was caused by a sudden increase in the drawbacks, according to Mr. Plunket, "with a view to "stimulate the export trade, and in order to assist the manufac- "turers in disposing of their sugar." The drawback was reduced again in the following year.

EFFECT OF THE BOUNTIES ON THE HOME SUGAR INDUSTRY.

From the evidence laid before your Committee, it would appear that loaf-sugar refining was formerly a considerable industry in this country, there having been in the year 1864 about 30 loaf-sugar refineries, converting in round numbers, 200,000 tons of raw into 140,000 tons of loaf-sugar per annum, and employing £600,000 floating, and £600,000 dead capital, in addition to the capital employed in other trades connected with the business.

Since 1864 there has been a gradual decline in the trade, until in 1875 it became practically extinct. In 1876, however, owing to a

partial failure in the beetroot crop of France, one sugar house again commenced working, and has continued working since that time, but not to its full capacity.

In 1878-9 two new loaf-sugar refineries commenced to produce loaf-sugar on a small scale. Mr. Duncan, the owner of one of these houses, gave as his reason for commencing to build it, his expectation that a change in the French law was about to take place which would lead to the abolition of bounties. This refinery, which did not start work until three years after it was built, is capable of turning out 400 to 500 tons of loaf sugar weekly, but the quantity produced was only about 170 tons weekly, and in 1879 this house was entirely closed.

Along with the decline in the manufacture of loaf sugar in this country, there has been a continuous increase in its importation from foreign countries. In 1863 the import amounted to 13,731 tons, of which 5,285 tons came from France, and 5,960 from Holland; in 1871 the import had grown to 78,551 tons, of which 37,000 tons came from France, and 27,500 tons from Holland; and in 1878 the import had grown to 157,807 tons of which 115,683 tons came from France, and 32,500 tons from Holland.

It would thus appear that our loaf sugar industry has, in the words of Sir Louis Mallet, undergone a "progressive process of extinction," owing to the fact that foreign loaf sugar, mainly from France and Holland, has taken the place of home-made loaf sugar in our own home markets.

There does not appear to be any ground for supposing that this state of things, entailing, as it has, the loss of a large amount of capital, and the consequent ruin of many of those who were engaged in the trade, is owing to any want of enterprise or of skill on the part of the refiners in this country, or to any natural disadvantages under which they labour; on the contrary, owing to the low price of coals, an important item in the cost of refining, and which, it is stated, are more than double the price in Paris than in London, and to other advantages they possess, there seems to be no reason why, upon equal terms, they should not only be able to compete successfully with foreign refiners in our own

markets, but also obtain a share of the export trade in loaf sugar now entirely in the hands of foreign refiners.

Sir Louis Mallet and Mr. Giffen attribute some amount of the depression to the fact that a decreased consumption of sugar on the Continent, and especially in France, threw a larger quantity of refined sugar on the English market to come into competition with English refined sugar. From a table handed in by Mr. Martineau, it would, however, appear that, although there has been a decline in the consumption in France from 320,630 tons in 1869 to 289,951 tons in 1878, there has been an increase in the consumption of the Continent of Europe from 681,004 tons in 1869 to 705,281 tons in 1877, and to 829,111 tons in 1878, with an occasional falling off in the intervening years.

There can be no doubt that a decreased consumption in France would have a tendency to promote exportation to the United Kingdom, the natural effect of which competition would be to reduce the price obtained by the refiner; but there is no reason to suppose that the English refiner could not have successfully competed against any such competition as this, had there not existed some cause or combination of causes by the operation of which the foreign refiner was enabled to put his sugar on the English market below cost price. That such a cause existed in the shape of a bounty cannot be disputed. Against such competition it is manifestly impossible for the English refiner to contend successfully, and it is owing to this bounty mainly, if not altogether, that the state to which the English loaf sugar industry has been reduced is owing.

There is, however, another branch of the sugar refining trade carried on in this country, the moist sugar refining, which has undoubtedly been as prosperous as loaf sugar refining has been the reverse. This is evidenced by the enormous increase which has taken place in the import of raw sugar for refining purposes, almost the whole of which is now converted into moist refined sugar.

In 1864 the net quantity of raw sugar used for refining was 393,681 tons. This quantity had in 1870 risen to 520,265 tons, and in 1875 to 635,519 tons; it fell in 1879 to 563,443 tons, but Mr. Giffen estimates the quantity for 1880 at 700,000 tons.

No moist sugar is manufactured on the Continent at present, and therefore no bounty on its export is obtained; but it need hardly be pointed out that, were the system of bounties on export extended to moist sugar, the question of the extinction of the trade in this country would be merely one of time, and the ruin which has fallen on the loaf sugar refiners would be followed by the ruin of the moist sugar refiners, and the destruction of a vast industry.

EFFECT OF THE BOUNTIES ON THE COLONIAL SUGAR INDUSTRY.

A considerable amount of evidence has been given before your Committee by proprietors and others interested in the growth of sugar in the West Indies to show the great importance of the trade to the West Indies, and the disastrous consequences which would follow from any abandonment of that industry.

The importance of this industry will be seen from the large amount of capital invested in it, the number of persons engaged in it, and the amount of wages annually distributed among them.

Mr. Giffen, by a rough calculation, estimates the capital invested in the growth of sugar in the British possessions at between four and five millions sterling; but he does not profess that this is a careful or a good estimate, but only a suggestion as a means of making the calculation of the present capital engaged.

Mr. Lubbock has objected that Mr. Giffen's estimate has been calculated on a wrong basis, and has put in a calculation by which he estimates that, taking the value of 1872, the prices of which year were, however, abnormally high, the total value of the estates in the West Indies is £12,700,000, irrespective of town property dependent on sugar interests, which, he says, must represent a large sum. The value of the estates in the Mauritius he calculates at £6,000,000, and in India at £1,000,000. If to this is added the value of the town property, and the property which is not sugar estates, but which is dependent on the sugar industry, Mr. Lubbock estimates that it would raise the amount of capital involved in this industry in the British possessions to fully £30,000,000 sterling.

The number of people employed in the industry Mr. Lubbock

estimates at 250,000, and the amount of wages annually paid them at £6,000,000 sterling.

The situation at present of this industry has been represented to your Committee by many witnesses as very grave and critical. Complaint is made that not only have the West Indian Colonies not participated in the benefit naturally to have been expected from the enormous increase which has taken place in the consumption of sugar in this country, but that these last few years the production has practically been at a standstill, and that only the prospect of effectual means being taken to remedy the evils under which they are suffering has maintained the production to its present extent.

Mr. Lubbock asserts that the prices obtainable in June, 1879, do not pay for the cost of cultivation, except in some cases where estates are peculiarly well situated; and in this he is confirmed by Mr. Chambers and by Mr. Hogg, who states that while certain estates may be able to produce sugar at a profit even now, yet, taking the average of estates in the West Indies, not only do they not pay anything to the proprietors, but that, as a whole, they are attended with a dead loss.

All the witnesses on this branch of the subject agree in looking forward to a general abandonment of sugar cultivation should the present state of things continue; and Mr. Hogg estimates that in ten years quite one-half of the production of the West Indies would be destroyed, and he states that already an abandonment of estates has begun, as an evidence of which he says that at the present time there are fully fifty estates in process of abandonment: that when he was in Jamaica in the beginning of 1879 thirty-six estates were advertised for sale without finding buyers, and that an estate for which £12,000 had been offered a short time ago was now being abandoned.

If such a result as this be likely to ensue, it cannot be regarded without grave apprehension. While other products are, to a small extent, exported from the West Indies, it is upon the success of the sugar industry that the West India Colonies mainly depend, both for the employment of their population and the collection of their revenue.

The present condition of things in the West Indies, it is asserted, has been produced by the unfair competition which the cane sugar has had to meet in their principal market—the United Kingdom, in the bounty-fed beetroot sugar imported from the Continent, chiefly from Austria, which has forced down the price below that at which it can possibly be produced.

In the very valuable tables of statistics with which Mr. Giffen has favoured the Committee, he gives on page 16 the average import prices of raw sugar from 1854 to 1879, by which it will be seen that since the year 1872 there has been a decline from 26s. 2d. per cwt. in that year to 20s. 3d. in 1879. The prices in 1872 and 1873 were evidently abnormally high, but taking the price of the year 1874, there has been a decline of about 2s. per cwt. The price in 1877 appears to have risen nearly 5s. per cwt. over that of 1876, which is accounted for by a large falling off of the import of beetroot sugar in consequence of a partial failure of the crop. Taking the quinquennial periods given on page 18, it will be seen that in the period from 1875-79 the price was 21s. 11d. per cwt., against 24s. 1d. in the period 1870-74, or a decline of 2s. 2d. per cwt.

Mr. Lubbock and Mr. Martineau, while not disputing the accuracy of Mr. Giffen's figures, take exception to the principle on which they have been formed. Mr. Lubbock, assuming that Mr. Giffen has taken the Custom House returns as the estimate of the value, points out that it does not at all follow that this is the price at which the sugar is realised, and he maintains that the tables he and Mr. Hogg put in, and which will be found in pages 402 and 407 of the Report of 1879, having been prepared by sugar brokers and based upon the monthly prices of the same kind of sugar, more correctly represent the prices obtained in the several years.

Mr. Hogg's table gives the price in 1874 at 22s. 4½d. per cwt., since which there has been a gradual decline, with the exception of 1877, to 20s. 5½d. in 1878, and to 18s. 7½d. for the first four months of 1879, a fall of 2s. 1d. per cwt. between 1874 and 1878, and of 3s. 9d. per cwt. between 1874 and 1879.

Mr. Lubbock in his table gives the average of eight year periods, and shows that the average price for clayed Manilla sugar for the

eight years ending 1879 was 19s. 10d. per cwt., as against the price of 16s. 6d. to 17s. on 14th June, 1879.

Mr. Martineau, again, points out, in order to show how the prices have been disturbed by the deficiency in the beetroot crops, that while the average price for 1876 given by Mr. Giffen was 21s., the actual average price for that year would only have been 19s., on the basis of the prices of June, 1876, before any disturbance took place in consequence of the partial failure of the beetroot crop, which caused prices to rise during the last three months of that year, and so raised the average price of the year from 19s. to 21s. This rise in price extended to 1877 and 1878, but in 1879 the prices went down again, and in the month of June, 1879, the average price had again fallen to 18s. 6d. per cwt.

Mr. Martineau gives these illustrations in order to show the dependence of the consumer on the beetroot crop, and the very low prices which rule when accidental circumstances do not take place.

This fall in prices has been concurrent with an enormous increase in consumption. Between 1861 and 1879 the consumption of raw sugar has almost doubled, while the price has fallen, according to Mr. Giffen's table, from 23s. 5d. per cwt. to 20s. 3d. per cwt.

Some portion of this fall may, no doubt, be attributed to the same causes as have operated in depressing the prices of other raw materials, but the chief cause is to be sought for elsewhere, and according to the evidence given before your Committee, it is found in the large quantities of bounty-fed sugar imported into the United Kingdom which Mr. Giffen states he is quite prepared to believe has forced down prices 2s. 6d. per cwt.

The following table showing the imports of beet sugar, raw and refined, and cane sugar, raw and refined, imported into the United Kingdom from 1854, taking the average of triennial periods, will show the manner in which the beetroot sugar has been continuously increasing, having risen from 5 per cent. in 1854 to 16 per cent. in 1869, and 32 per cent. in 1878, the average quantity imported in the three years ending 1854 being 17,090 tons, and in the three years ending 1878, 305,594 tons.

Imports of Raw and Refined Sugar into the United Kingdom.

Average of Three Years ending	Raw Cane Sugar.				Refined Cane.				Total Cane, Raw and Refined.				Per-Centage of Total.	
	British Possessions.	Other British Pos- sessions.	Total.	Foreign Countries.	Raw Beet.	Tons.	Refined Beet.	Tons.	Total Cane, Raw and Refined.	Tons.	Beet, Raw and Refined.	Cane.	Beet.	
1854	161,666	123,166	284,732	101,106	385,838	2,384	2,702	14,706	388,540	17,090	95	5		
1857	144,526	122,869	267,395	113,578	380,973	10,295	1,203	14,475	382,176	24,770	94	6		
1860	166,629	98,995	265,624	161,860	427,464	20,312	2,125	14,380	429,589	34,692	92	8		
1863	186,264	88,401	274,665	227,516	502,181	16,275	852	13,613	503,033	29,888	94	6		
1866	187,357	63,704	255,061	221,750	472,811	37,918	1,906	38,520	474,717	76,438	86	14		
1869	189,235	45,716	234,951	267,328	502,779	53,472	468	43,418	503,247	96,890	84	16		
1872	191,125	65,873	246,998	286,059	533,057	111,973	2,631	82,042	635,688	194,015	73	27		
1875	206,573	58,262	264,835	366,889	631,224	112,710	8,761	122,109	639,975	234,819	73	27		
1878	194,846	78,778	273,624	353,379	627,003	168,855	11,472	146,739	638,476	305,594	68	32		

The operation of the Austrian bounty will be seen by the increase of the imports of raw sugar from Germany, which includes Austria, and the decrease of the imports from France where no bounty is obtained on the export of raw sugar. The last three years, from 1876-8, showing an average import from France of 467,600 tons, compared with an average of 962,000 tons for the three preceding years, and from Germany an average of 1,935,500 tons for 1876-8, compared with an average of 610,000 tons for the three preceding years.

Turning from this enormous growth in the import of beet sugar to the import of cane sugar, it will be seen that the imports from the West Indies have remained practically stationary, the average imports for the triennial period ending 1878 having only exceeded that of the triennial period ending 1872 by 3,700 tons. The average for the three years ending 1875 was disturbed by an exceptionally heavy crop in 1875. From Mr. Giffen's table it will be seen that the import for 1878 is only 192,000 tons against 210,000 tons in 1876.

The imports from other British Possessions show an import in the period ending 1878 of 78,778 tons against an import of 55,873 for the period ending 1872, and of 45,716 tons for the period ending 1869, but this is accounted for by the rise in prices in 1872 and 1877, which brought large additional supplies from India, Mauritius, and other British Possessions, which only send a small portion of their crops here, unless attracted by high prices. This will be seen on referring to Mr. Giffen's table, where the import from British Possessions other than the West Indies is given as 53,274 tons in 1878, when the average price was 21s. 6d., as against an import of 117,870 tons in 1877, when the average price was 25s. 9d.

The imports from foreign countries are regulated by the same conditions of price as those from the British Possessions other than the West Indies. The high prices of 1872, 1873, and 1877, brought large supplies from foreign countries, and raised the average imports for the three triennial periods ending 1872, 1875, and 1878. Turning, however, to Mr. Giffen's table, it will be seen that the

import for 1878 is only 322,390 tons against 387,610 tons in 1877, 350,131 tons in 1876, and 408,326 tons in 1875, showing a marked falling off.

An examination of these statistics and those of other European countries shows that there has been an actual decrease of the consumption of cane sugar in Europe during the last twenty years, the void being of course supplied by the production of beet sugar. On the other hand, the imports into the United States, which are almost exclusively from cane-growing countries, have increased during these twenty years from 230,000 to 650,000 tons. Your Committee may observe on these figures that they deal with importation from cane-growing countries in general, and not with the importation from the West Indies in particular; and, further, that no inference can be drawn from them with reference to the effect which the Austrian bounties may have had on the importation of raw sugar into the United States.

The table of production given by Mr. Giffen does not profess to be complete, and the figures for the East Indies is not production, but only exportation.

Taking the figures for the West Indies alone, and calculating the average of the three years, 1869-71, 1870-72, 1871-73, 1872-74, 1873-75, 1874-76, 1875-77, 1876-78, the production will be found to have been :—

	Tons.		Tons.
1869-71 .. .	170,890	1873-75 .. .	195,261
1870-72 .. .	175,526	1874-76 .. .	195,900
1871-73 .. .	184,595	1875-77 .. .	203,350
1872-74 .. .	181,469	1876-78 .. .	197,167

showing an increase from the period 1869-71 to the period 1873-75, but practically no increase since that time.

The production of the Mauritius appears to vary considerably. The average for the triennial period, 1870-72, being 115,000 tons; and for that of 1877-79, 132,000 tons.

The production of the other British Possessions given in the Table [after deducting the figures for the East Indies, which only indicate export, the extent of which is probably altogether depen-

dent on the prices here, the increased price of 1877 having attracted 75 per cent. more than in 1876], shows an increase of only 800 tons between 1871 and 1877. In 1878, however, an increase of 5,500 tons took place in the Australian production.

The production of foreign cane sugar, it will be seen, shows, on the whole, a decline during the last 10 years, the average of the years 1876-8 showing a production of 1,300,000 tons against 1,327,000 tons for the years 1868-70, this being more than accounted for by the decrease in the production of Cuba.

Taking the total production of cane sugar throughout the world, so far as we have the figures, it will be found that, on the whole, there has been a small increase in the triennial period, 1876-8, over that of 1869-71. Since 1875, however, there has been a small decrease.

Comparing this with the production of beet-sugar, which increased from 873,000 tons in 1871 to 1,574,153 tons in 1879, the extent to which the beet-root sugar is outgrowing the cane sugar will be evident.

It will thus be seen that the beet-root sugar, artificially stimulated by a bounty, has alone participated in the increased demand caused by the increased consumption since the year 1871, while the production of cane sugar has been practically stationary.

Your Committee have no reason to think that any other cause exists, except the bounty, to prevent cane sugar competing successfully with beet-root sugar, or that any want of attention can be charged against the growers, although no doubt the state of uncertainty under which they carry on their operations on account of the bounty must, to a large extent, check enterprise; and were the bounties removed, there is every reason to believe that a large development would take place in the growth of cane sugar, it being stated that the West Indies alone could produce enough sugar to supply the whole of the United Kingdom. On the other hand, if the bounties were allowed to continue, your Committee are satisfied that it will be attended with the most disastrous consequences to our sugar-growing Colonies.

PICCARD'S SYSTEM OF UTILIZING THE HEAT
ESCAPING FROM AN EVAPORATING LIQUID.

Communicated by P. O. WHITEHEAD, Old Trafford, Manchester.

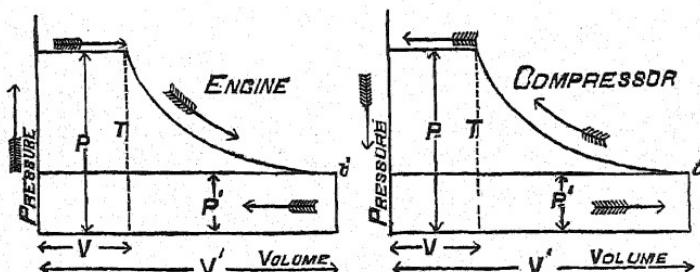
(Continued from page 482.)

V.

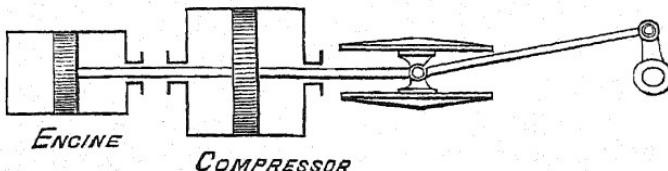
The foregoing considerations already permit a glimpse at the advantages to be derived from the principle of compression, even when the motive power has to be supplied by the steam-engine. We have still to prove that this is a considerable advantage, when constant evaporation is required and the quantities of fluid are large. The fuel should not be employed for boiling, directly, the liquid to be evaporated, but to heat a steam generator which shall put into action a motive machine. We will endeavour to fix the conditions of this application and determine its economical bearing.

Suppose the diagram of pressure taken in the cylinder of a steam-engine (admitting, for the sake of simplicity, that expansion is carried out to the utmost) to be represented by the dotted line (Fig. 5); with the surface T, representing the work done by a stroke of the piston.

In the cylinder of the compressor, the diagram (Fig. 6) has exactly the same form, and besides, the surface or expended work T, is calculated with the same formula as that used for the steam-engine.



In a word our compressor is an inverted steam-engine, which can be arranged in such a manner that it can be driven directly by a motive engine, the piston of which is connected with that of the compressor by a rod (Fig. 7). If the pressures were the same in



the cylinder of the engine and in that of the compressor, the latter would, theoretically, absorb, at each piston stroke, exactly as much work as the steam engine would produce; so that it would be necessary to expend in the steam-engine as much steam as would be reproduced in the compressor. In practice, however, inevitable waste will occur to destroy this equality.

We shall see that by properly choosing the conditions of compression, we may reproduce much more steam in the compressor than is expended in the motive engine.

Admitting that the curve of expansion is an hyperbola, which is sufficiently exact in practice, the formula which gives in foot pounds the work T , of a stroke of the piston, of both engine and compressor, is (see Figs. 5 and 6) :

$$T = v p \text{ hyp. log. } \frac{p}{p'}$$

where p' and p denote the extreme pressures of the steam in pounds per square foot, v denotes the volume of the steam at the pressure p , in cubic feet.

This formula, very convenient for numerical applications, enables us to calculate the work employed and to form our conclusions; but it is simpler, in this particular case, to demonstrate from a known principle in the mechanical theory of heat.

If we call t , the temperature of the steam at the pressure p , and t' the temperature at the pressure p' , the work is proportional to the fall of temperature $t-t'$. This is equally true of both steam engine and compressor.

If, for instance, the engine is a condensing one (104° F.), and

the steam is supplied to it at 8 atmospheres ($+ 105$ lbs.) (338° F.) it will work with a fall of temperature equal to $338 - 104 = 234^{\circ}$ F.

If the heating surface of the evaporating boiler is calculated in such a manner that a difference of 27° F., between the fluid and the compressed steam which has to raise its temperature by transmitting the required amount of heat is sufficient, the compressor will work with a fall of temperature of 27° F.

It follows from the principle above mentioned, that, for a given weight of steam supplied to the machine and falling from 338° F. to 104° F. the recovery of heat of an equal weight of steam, compressed just enough to raise its temperature 27° F., will absorb only the $\frac{27}{234}$ of the work of the machine. In other words, the total work of the machine will reproduce the heat of a weight of steam to $\frac{27}{27}$ of the amount originally supplied.

With a pound of steam supplied to the machine and falling from 338° F. to 104° F. we shall recover the heat of $\frac{27}{234} = 8.66$ lbs. of steam borrowed from the liquid to be evaporated; or a pound of steam, produced in the generator, will evaporate 8.66 pounds from the liquid to be heated. Consequently, 8.66 times less coal will be consumed than by evaporating over an ordinary fire.

These figures, it is true, take no account of the friction of the machinery, nor of the real cycle being unequal to the theoretical.

The numerous experiments made with Watt's indicator on steam engines with sliding valves, prove that the real surface T is only equal to 0.80 or 0.85 of that given by calculation. This difference is chiefly due to the choking of the steam in the valve. Again, the force, measured by the break on the shaft of the machine, is only 0.85 of that given by Watt's indicator. This loss results from the friction of the machinery.

The actual disposable force, then, is found to be only 64 to 68 per cent. of the calculated force.

It is to be observed that in the machine now occupying our attention, the two pistons are always fixed to the same rod. By this arrangement the loss sustained by friction will be considerably diminished.

For large engines supplied with the Corliss valve gear at present

in use, the co-efficient 0·85 for the surface T of the cycle is certainly too low.

Let us admit this co-efficient for the cycle of the steam-engine and apply it also to the work of the compressor. Taking the co-efficient 0·80 for the friction of the two machines together, the theoretical result which we have found will have to be multiplied by the co-efficient 0·578 the continued product of the co-efficients $0\cdot85 \times 0\cdot85 \times 0\cdot80$ being 0·578.

The real effect produced by a pound of steam admitted into the cylinder of the steam-engine will be $8\cdot66 \times 0\cdot578 = 5$; that is to say, we shall evaporate in the example we have chosen, five times as much fluid as by heating over an ordinary fire.

VI.

The multiple action apparatus, already examined, has an advantage over the compression system, in avoiding the intermedium of all mechanical work, and consequently produces a practical result, not affected by the coefficient 0·578.

We have seen, however, that its action is limited, and that the quantity of steam taken from the liquid to be evaporated can scarcely, in practice, exceed the double or triple the weight of the steam condensed in the intertubular space of the first boiler. The multiple action apparatus, utilizing successive falls of temperature beginning at about 212° F., that is at a pressure approximately equal to that of the atmosphere, can be advantageously employed to utilize, for evaporation, steam which has already done mechanical work in a steam-engine.

But it must be observed that in a great number of manufactures the motive power employed is very unimportant, compared to the quantities of fluid to be evaporated. We will mention, as examples, salt works, chemical and dye works, and even sugar manufacturers, in which much more steam is employed for the motive power than is absolutely necessary, under the pretext that the waste steam aids the evaporation.

For all these manufactures it would be very advantageous to utilize, for evaporation, steam at high temperatures and pressures

but its direct employment under these conditions presents, both for the preservation of the substances to be treated, and for the construction and keeping in repair of the evaporating boilers, such inconveniences that until now it has been necessary to abstain from using the higher degrees of the thermometrical scale in multiple action apparatus.

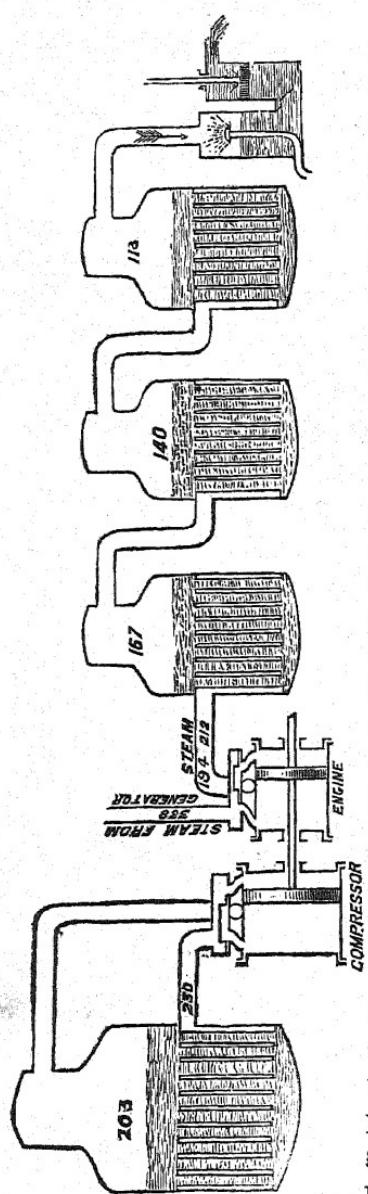
For these manufactures the system of evaporation by reproducing the heat of steam, by means of the compression yielded by it when at high pressure, is clearly marked out. Compared to evaporating by an ordinary fire it admits of a saving of fuel amounting to 75 per cent. and upwards, or 50 per cent. more than can be claimed for even the best triple action evaporating apparatus. Besides, it offers the considerable advantage of allowing us at will to carry on all the work of evaporation in a single boiler, and does not force us, like the triple action machine, to have several boilers working at different temperatures and pressures. The management of a triple action machine requires constant attention to keep up in each of the boilers the temperature best suited to the transmission of heat across its tubular surface. Every excessive variation in the temperature and pressure in a boiler reacts necessarily on the following one, and deranges the united action of the machine.

The compression apparatus also allows the evaporation to go on in as many distinct vessels as the liquid to be heated may require. We may, at will, cut off the communication of an evaporating vessel with the compressor, and fill, empty, or open it without interrupting or influencing the action of the others; and, as already observed, cause evaporation at any temperature we may desire without foregoing any of the advantages of compression, however low that temperature may be.

VII.

COMBINED SYSTEMS OF COMPRESSION AND MULTIPLE ACTION.

It is easy to combine the advantages peculiar to the compression evaporating system with those of multiple action (Fig 8.) It suffices for that purpose to employ the fall of temperature of the steam falling from the pressure of the generator to the pressure adapted to the working of the multiple apparatus.



Let us suppose that a generator produces steam at eight atmospheres (+ 105 lbs. pressure), that is, at 338° F., and that we have a triple-action apparatus receiving it at 194° F., or a little under one atmosphere. The steam, in descending from 338° F. to 194° F., will serve to drive a compressor, by utilizing the fall of temperature of 144° F.

Our evaporating apparatus being constructed in such a way that its tubular surface will transmit the necessary quantity of heat, with a difference in temperature of 27° F. between the liquid to be evaporated and the steam (a difference greater than that which is found in ordinary triple-action apparatus), we shall obtain the following desirable result: $\frac{1}{27} \times 0.578 = 3.1$; which signifies that for each pound of steam falling from 330° F. to 194° F. while passing through the motive cylinder, we shall evaporate 3.1 of the liquid to be concentrated.

The motive steam will be sent at 194° F. to the first boiler of a triple-action apparatus, and in this way we shall have obtained for each pound of steam taken from the generator a total production of six pounds, viz., three in the compres-

sion apparatus and three in the triple-action.

We double, then, the quantity of steam taken from the liquid

to be evaporated without increasing the consumption of fuel; or, in other words, we save 50 per cent. more fuel than the best known process now in use.

As, by increasing the transmitting surface, we can reduce, at will, the fall of temperature required to transmit a given amount of heat, so, in certain cases, we can considerably augment the action of compression. Thus, by constructing an evaporating machine driven by a fall of temperature of only 18° F., but retaining in other respects the same conditions as above, the action of compression represents

$$0.578 \times \frac{144}{18} = 4.62$$

By adding the action of a triple apparatus, the total effect would be 7.62.

It must be observed that in compression machines we can, without inconvenience, make the difference between the compressed steam and the liquid to be heated as small as we please. There are no disturbances in the action to be dreaded; and if the condensing surfaces are properly calculated, which is a matter of no difficulty, the apparatus works as regularly with a small difference of temperature as with a great one. The useful effect of these apparatus may, therefore, be very considerably increased, though not indefinitely. The greater number of solutions, requiring a higher temperature to produce ebullition, than distilled water. However this may be, the result given above of 7.62 is not at all exaggerated, and is easily attainable.

VIII.

APPLICATION OF THE COMBINED SYSTEMS OF COMPRESSION AND TRIPLE ACTION.—COST OF APPARATUS FOR A GIVEN EVAPORATION OF SYRUP.—ECONOMICAL VALUE OF THE SYSTEM.

We have now to examine an objection which naturally occurs to the mind. Is not this large saving in fuel, effected by the employment of so much machinery, counterbalanced by the enormous expenditure, in interest, and the natural wear and tear?

It will be sufficient, in reply to study the cost of an establishment capable of evaporating a given amount of liquid per diem;

and we will choose, for example, one capable of concentrating 220,100 gallons of beetroot juice, yielding 52,824 gallons of syrup. It is a question then of evaporating 167,276 gallons of water every twenty-four hours.

To simplify the conditions of the problem, we will take no account of the escape steam which is made use of, in varying proportions, in different sugar factories, but suppose that evaporation is produced by direct steam.

By employing the mixed system, mentioned in the last chapter, the 167,276 gallons must be evaporated partly by compression apparatus and partly by triple action. Taking the date of the first example given, that is, admitting that compression apparatus works with a difference of temperature amounting to 27° F., we shall have divided our evaporation equally between the compression and the triple action apparatus; each of which will convert 83,638 gallons into steam.

The triple action apparatus evaporating 83,638 gallons will have a tubular surface, less by one half than a similar one evaporating 167,276 gallons. On the other hand, our boiler, working by compression and using a difference of temperature of 27° F. will have a heating surface about equal to that of the triple action apparatus, which has the same fall of temperature between each boiler.

The heating or tubular surface of our combined apparatus, taken as a whole, will then have the same extent as that of a triple action machine evaporating 167,276 gallons and will be divided amongst four boilers, viz.: one half in the sole compression boiler and the other half in the three triple action boilers.

This system, then, compared with the present manner of evaporation, necessitates no increase of heating surface and, consequently, no real increase of expense for the so-called evaporating boilers; for, while a compressor is required, only half the amount of steam is necessary, with a like reduction in the number of generators or steam boilers used. We shall thus have on the one hand an increase of expense, and on the other a reduction. The relative proportions cannot be stated with perfect

accuracy, but we can give figures which will serve as a basis for ascertaining the total cost in any desired locality.

Let us first decide on the dimensions of the compressor required.

Choosing, at will, the boiling point in our compression boiler, we fix the temperature of the juice at 203° F., and that of the compressed steam at 230° F.

We have to evaporate 83,638 gallons every 24 hours, equal to 3485 gallons, per hour, or 58 gallons per minute. The specific volume of saturated steam at 203° F. is 1950; we shall therefore have to suck up $58 \times 1950 = 113,100$ gallons of steam per minute, that multiplied by 0·16 gives 18,096 cubic feet.

Admitting that the compressor and machine make 40 revolutions per minute, and that the latter has two cylinders, coupled like the compressor, we shall have $4 \times 40 = 160$ piston strokes per minute.

Each cylinder of the compressor should then have a theoretical volume of $\frac{18096}{160} = 113\cdot3$ cubic feet; figures which must be increased by one-fourth to allow for deficient results.

The volume of each of the two cylinders will then be 141·6 cubic feet, or 68 inch diameter and 68 inch stroke.

The engine making the same number of piston strokes as the compressor, and having the same throw, each cylinder will hold a weight of steam equal to one-third of that contained in the cylinder of the compressor. Admitting that expansion goes on in the engine, till the steam is at 194° F., we have:—

Weight of steam per minute, $\frac{58}{3} = 193\cdot66$ lbs.

Specific volume of saturated steam at 194° F., 2311.

Volume of steam expanded per minute $\frac{193\cdot66 \times 2311}{62\cdot336} = 7177\cdot5$ cubic feet.

Volume of cylinder, $\frac{44\cdot85}{160} = 44\cdot85$ cubic feet.

Diameter of cylinder, 38·12 inches.

Length of stroke of piston, 68 inches = 5 feet 8 inches.

Let us see now how much we shall save in generators or steam boilers, seatings and chimney, and air-pump and condensor.

With compression and triple-action apparatus combined we need generators less powerful by one-half than if we carried on entire

evaporation by the present methods, since a pound of steam by this system produces twice as much effect.

To evaporate 1,672,760 lbs. of water every 24 hours, or 69,698 lbs. per hour, with an ordinary triple-action machine, we should want ~~1,672,760~~ = 23,232 lbs. of steam produced by the generator. With the mixed apparatus we required ~~1,672,760~~ = 11,616 lbs. Admitting that 1 lb. of coal produces 7 lbs. of steam, we should burn with the ordinary triple-action machine ~~23,232~~ = 3319 lbs. of coal per hour; while in this mixed apparatus only 1659—nearly 15 cwt.—need be consumed.

With boilers constructed under favourable conditions, only $1\frac{1}{2}$ lbs. of coal ought to be burnt per hour for each square foot of heating surface.*

The total heating surface of the generators, in employing triple-action machines, will then be 1247 square feet, while in the compound machines it would only amount to 624 square feet.

In this way we shall have saved half the cost of construction of the steam generators, or, say, three to four forty-horse boilers, with the expenses for constructing the brick-work seating, chimneys, water supply, &c., necessary for those boilers.

It will be easy, from the above data, to state in each case the amount of this saving, and to compare it with the expense necessary for the construction of the compressing engine.

We can state, however, from exact calculations made under various conditions, that they equalize, and that the application of the combined system of compressor and triple action, compared to the ordinary triple action heretofore employed, will not sensibly increase the original cost of construction.

To treat 220,100 gallons of juice in 24 hours by this system, we need bring to the condenser only half the amount of steam it would have received in the triple-action method; hence there results a considerable saving in favour of this system, not only in the construction of our condenser and its air-pump (which will be

* The reader must remember that 1 lb. of steam costs no more fuel when generated at eight atmospheres than at five. The diagram, Fig. 1, page 425, shows that the total heat of steam varies slightly with the pressure at which it is produced; but in practice this small difference may be entirely ignored.

smaller by one-half), but in the quantity of water required for injection, and the power or steam required to work it. It is difficult to state this in figures, but it will be easy, in each particular case, to appreciate its importance.

We have just seen that the cost of construction of a compression and triple-action machine combined will be about equal to one of the same power for triple action alone.

There will then be no difference between the two systems, as far as the interest of the invested capital is concerned.

As to the wear of machinery, the advantage is on the side of our system, because *ceteris paribus*, we substitute a steam-engine for half the generators; and it is well known that the cost of repairs and the wear of an engine are less than those of steam boilers. Lastly, with regard to the space occupied, this system offers an evident advantage. The compression machine, replacing half the generators, will not take up a tenth of the room which would be necessary for them, especially if in calculating the space occupied by generators we take into account their appurtenances, coal supplies, communicating roads, &c., &c.

In addition to these advantages, let us see what saving of coal we shall realize in treating the 220,100 gallons of juice every 24 hours. It has already been shown that this saving amounts to 1659 lbs. of coal per hour, or, for a course of operations extending over 120 days, 2131 tons, which, at five shillings per ton, amounts to £538.

We will only observe that to keep within the conditions of the example chosen (the concentration of beet-root juice), we have based our deductions on a duration of 120 days. It is easy to form an idea of the immense advantages our system offers when applied to a manufactory working all the year. For the same amount of water converted into steam, that is 220,100 gallons in 24 hours, the saving in 300 days would be 5,328 tons—equal to £1,332.

These considerable savings (75 per cent. has been actually realized in the production of salt,) may be brought within the reach of the numerous branches of industry having to perform extensive evaporation.

IMPROVEMENT IN CANE MILLS BY M. FAURE, OF
LIMOGES, AND M. LÉON MARIE'S NEW MEGASS
FURNACE.

In April last the writer visited the French island of Martinique, mainly to see a new process of crushing the sugar canes, which was said to give very good results. The experiment was witnessed at the *usine* Pointe Simon, at Fort de France, but the machine was also at work in two other *usines*.

The invention was one patented by M. Faure, of Limoges, and consisted of a fluted roller revolving rapidly over a bed-plate in front of the mill. The canes were passed horizontally between this roller and the plate, and split open from end to end. As they emerged from this cane-splitter, a girl turned them, so as to cause them to enter the mill longitudinally in the usual way. The patent cane-splitter is made to suit any mill it is intended to feed, and is placed before it so that the canes pass through it on their way to the mill. It is a very simple yet effective apparatus, and can be placed before any mill at present in use.

The mill we saw, driven by an engine of 40-horse power, supplied with canes split open by this additional roller, crushed 16 tons of canes per hour.

The rollers of the mill were $31\frac{1}{2}$ in. diameter, and 4 ft. 11 in. long, revolving at the rate of 1 minute and 30 seconds each revolution, or about 11·4 feet per minute.

We were informed that the result obtained from the mill was most satisfactory, and quite equal to anything that had been accomplished by watering the megass and double crushing. From 80 to 82 per cent. of the weight of the canes was obtained in juice.

Our observation led us to believe that the process was a very good one, as we had not seen anywhere more completely squeezed megass.

The megass was carried to a floor above the boilers, and there fed through openings in the floor into M. L. Marie's patent furnace placed in front of the ordinary multitubular boiler. The furnace was entered by a neck, throttled by a balanced door, which opened on a basket

of megass being shot down the tube, and closed the moment the megass had passed into the furnace below. The furnace was a chamber made of iron, and cased outside with bricks, and the combustion was effected in it completely before the flame and heat passed to the multitubular boiler. The whole of the smoke was burnt, the chimnies of the *usine* presenting a great contrast in this respect with those of its neighbours. We understand that the saving of fuel effected by this simple apparatus is very great, and that the *usine* has had to cancel large contracts for coal entered into before the invention was tried.

The Colonial Company, Limited, of 16, Leadenhall Street, London, are going to erect, for the coming crop, two of these "Défibreurs" in their Usine Saint Madeleine, at Trinidad, West Indies, and they have, we understand, been appointed by M. Faure his *sole* agents for this important patent for all the British Colonies, and also general agents for the United States and Sandwich Islands; and if the results, which appeared to us to be very considerable, are as great as we have been since informed they are, there can be no doubt that M. Faure's addition to the sugar mills will be universally adopted, as well as the patent furnace for megass. We can strongly advise our readers, from our observations in Martinique, to inquire closely into the facts and figures, and we have no doubt that the Colonial Company will be able and glad to answer any inquiries and give exact information.

NEW SUGAR MILL AT ALBERTON, QUEENSLAND.

SUTTON'S ATMOSPHERIC EVAPORATORS.

The sugar mill which has just been erected at Alberton marks a new and most interesting departure in the sugar industry. A small number of cane-growers in the neighbourhood have started a mill on the co-operative principle. Anxious to emancipate themselves from the necessity of selling their cane to the proprietors of distant mills, they resolved to erect one for themselves in the middle of their canefields which should be worked and managed by the joint

proprietors, and which beyond other advantages would save the wasteful cost of a large and unnecessary carriage. Happily the cane-growers on the Lower Logan had been sufficiently prosperous to allow them to subscribe the required amount. Eight of them put down £100 apiece, and made overtures to Mr. Sutton which have resulted in his erecting the mill and machinery for £1,500, and allowing the balance of payment to extend over three years. The proprietors, who are Germans and men with families, will work the mill themselves, and we may be sure that the work done will be something more than the equivalent of what the ordinary rate of wages will purchase in the mills of other proprietors. The establishment in this colony of any enterprise on the co-operative principle is full of interest, and this Alberton sugar-mill seems to us to start with every augury of success. The initiators are small capitalists who have much to lose by failure, and much to gain by success, and from the inspection we were enabled to make of their excellent little mill on Saturday we have no misgivings regarding their sure and rapid prosperity.

Beyond, however, the question of co-operation, this Alberton mill has another very special interest. A new method of manufacture has been introduced that is not only a novelty in this colony, but so far as we know has not been tried in any other sugar-growing country. The concentration of the liquor in the battery is managed by means of artificial ebullition, a current of air being pumped through the liquor, which is only heated sufficiently to give off steam. In this manner evaporation, which is astonishingly rapid, takes place under conditions as favourable as if it were effected in *vacuo*. The battery consists of three iron pans set at different levels to allow the liquor to be passed forward by its own gravitation. The bottom of the back pan, for instance, is a few inches above the rim of the next, and a cock in front makes the passage of liquor forward depend simply upon the turning of a tap. The middle pan stands in the same relation to the next, which takes the place of a teache, and this is emptied by a small centrifugal pump, which is driven by a belt attached to a fast and loose pulley, and worked from the shaft of the engine.

that drives the fans for producing the air-blast. The liquor thus pumped is discharged into receiving tanks that act as subsiders, and which are raised sufficiently to allow of the liquor being run when required into the finishing pan, of which we will speak presently. Each pan in the battery has two copper coils, the one being a fixture within $\frac{1}{2}$ in. of the bottom, and the other immediately over it, lifting up from one end by means of the ordinary stuffing boxes, to allow of the pan being cleaned. The lower coil is perforated on its under side, and connected by a valve with a 7 in. air-pipe, that runs from the air-pump along the outside of the battery. The upper coil is for heating the liquor, direct steam being used for this purpose. When the valve connected with the perforated coil is opened the surface of the liquor breaks into violent agitation, due to the numerous currents of air that are forced through it from below. It has all the appearance of a rapid boil, and although the temperature is kept at about 150° Fahrenheit, steam is given off very quickly. The liquor is so thoroughly opened up, as it were, by the passages forced through it by the air bubbles that the evaporating surface is enormously increased, and concentration is effected very rapidly. Before coming to the battery the juice has been boiled and skimmed in the clarifiers, and in the first pan it is boiled and cleaned till no more dirt rises, after which the air currents are passed through it, reducing its temperature to 150°, and it is passed on to the next pan, and then to the next, according as space is wanted for fresh liquor. At a density of about 23° Beaumé, it is sent up into the receivers. This is managed by turning a valve that lets the liquor into the little centrifugal pump, and the pan is run dry. The finishing pan is a square copper vessel with the same arrangement of coils as in the battery pans, the exhaust steam from the small engine that drives the air-pumps supplying the heating power. Here the liquor is kept at a temperature of about 160° or 170°, and the current of air is kept continually bubbling through it. There is, of course, no churning of the liquor as is the case in Wetzell, Bour, or other pans whose principle is a revolving agitator, nor is the liquor exposed to the disadvantage of partial subjection to a

much higher temperature, as is the case with the small quantity that is lifted by the Wetzell tubes, or that falls over the discs of the Bour pan. Every particle of the liquor is subjected to an equable temperature and is kept in constant agitation, and concentration is effected very speedily. The charge of sugar run off while we were there had granulated in the pan and commenced setting directly it was in the cooler, and all the other coolers in the mill containing sugar were perfectly solid. It is claimed for this atmospheric pan that grain can be built up as in the vacuum pan, and that, as there is no beating of the liquor, a large solid crystal is formed that can be washed white with very trifling loss. We cannot speak positively of this, the receivers that should have replenished the pan at the time of our visit being empty. From what we did see, however, we are convinced that the method both in the battery and in the finishing pan is a very great improvement upon all other open pan processes with which we are acquainted. The economy of labour, too, is very great. One man at the battery is all that is wanted. The concentration, moreover, is very much more rapid by this atmospheric ebullition than by ordinary boiling, while the saving of loss from the conversion of crystallisable sugar into molasses, which inevitably takes place during the application of extreme heat, is avoided. A furnace has been put under the battery at Alberton, as the capacity of the boiler is somewhat deficient, but with direct fire and full steam on it is impossible while the air current is passing through the juice to raise the temperature beyond 170° Fahr. Two rotary blowers, such as are used for creating a blast for foundry purposes, are used, the one for supplying the atmospheric coils in the battery and the other for the finishing pan. Both are worked by a six-horse power engine, which is a very much more powerful one than is needed. A six-horse power engine drives the mill, the rollers of which are very small, not more than 18in. There is thus a disproportion in the power of the mill and of the battery, the latter being able to turn out three tons, whereas the rollers cannot supply liquor for much over a ton. Probably in a season or two the advisability of a larger mill and more powerful boiler will suggest itself to the

proprietors, when the factory would be capable of turning out at least 15 tons per week.

Mr. Sutton is about to erect another mill in the same neighbourhood, in which his patent will also be used. Mr. Randle, at Eagle Farm, at whose place the trial was made with Mr. Sutton's model in October last, has also adopted the atmospheric evaporator, and one of these pans has been erected at Mackay. The latter, we understand, has so far not been worked to very great advantage, from causes, however, that we are assured are avoidable. The invention certainly appears to us a most valuable one, and we cannot doubt the process being an immense improvement on the old system of evaporation.—By a Special Correspondent of *The Queenslander*.

ORANGE CULTURE IN FLORIDA.

In his report to the Foreign Office on the trade of Pensacola, and some of the internal resources of the State of Florida for 1879, Mr. Consul Cridland gives some interesting particulars with regard to the cultivation of the orange in that State. He says that formerly in Florida, as in most of the cotton States, the whole time and attention of the people was engrossed in the cultivation of the cotton plant and the sugar cane. Fruit growing was looked upon rather with contempt, and no value was attached to the wild orange groves in the State any more than to the same quantity of other timbered lands. In fact, very frequently the wild orange trees were cut down and destroyed to make room for cotton and sugar. Of late years, however, the people of the district named have found out the importance and profits of tropical fruit culture, and the old wild orange trees are highly prized, and are converted into sweet oranges by grafting. The difficulty in regard to orange culture is the impatience for immediate results. The orange, if cultivated from the seed, requires from seven to ten years of attention before it begins to bear fruit, and the lack of patience and confidence deters people from starting an orange grove and persisting in its care. The quality of the Florida

orange, and the excellent condition in which it reaches the northern markets, render it a most profitable crop. There can be no fear of an over production of the orange or lemon, when it is considered what a vast country has to be supplied. In 1879, 4,000,000 dols. worth of oranges and lemons were imported into the United States, and the orange crop of Florida was valued at over 1,000,000 dols. From information published lately it is probable that the orange crop in Florida this season will be 100,000,000 of oranges, for which the dealers will give the growers 1,500,000 dols. The orange crop will double itself every three or four years, and considering that the reports to the governor show that there are over 20,000,000 of trees in the orange groves of Florida, in future years the crop will be enormous and exceedingly profitable, and if the 20 per cent. *ad valorem* duty continues, it will stop the importation of oranges from Sicily, Spain, and the West Indies.

THE CYCLONE IN JAMAICA.

The following letter has been received from the Rev. James Roberts, son-in-law of the Rev. W. Griffiths, formerly of Sheffield:—

"I am just in from Mount Regale, near Richmond, and hasten to give you a few particulars as to the ravages of the terrible hurricane of last night. I was staying with the Rev. George Sanguinetti. The storm began about eight, but did not become alarming till near nine. A little before ten the new roof of the chapel fell in with a crash, then the house began to sway and rock, and we thought it advisable to get into one of the store rooms underneath, partly cut out of the rock. At about half-past eleven the house fell over our heads with another awful crash, destroying almost everything in the house. We passed the remainder of the night (nine of us) in this little room, holding umbrellas over our heads to keep off the dripping wet, until near daylight, when the storm lulled and kind friends came to inquire after our welfare, and tell tales of personal distress, which were truly pitiable. I took down the names of forty heads of households, who had

lost their houses entirely. On my way home I found not one house in six standing, and the whole country presented an aspect of devastation. Hundreds of cocoanuts and other fruit trees were thrown down, cultivation of all kinds—sugar, corn, yam—destroyed, the mass of the people left homeless and not knowing where to go for shelter, and chapels wrecked in every quarter. Besides Mount Regale Chapel, I may mention Lewisburgh, Rev. G. Sanguinetti, levelled to the ground, Job's Hill destroyed; Butmird, Rev. D. G. East, levelled; Morant Charles, chapel and school levelled; United Wesleyan, unroofed; Grateful Hill, partially unroofed; Sans Souci, Wesleyan, levelled; Belmont, Rev. D. B. Douse, completely unroofed; Bethnel, levelled; Allman Hill, reported down; Mizpah, reported down; Brandon Hill, Rev. J. Thompson, reported down; Oberlin, Rev. J. Tilley, one-half down, and part of house down; Stoney Hill, Rev. J. W. Mold, levelled except the vestries. The above I actually saw for myself except the three cases marked reported.

"August 19."

THE WEATHER AND THE SUGAR CROP IN DEMERARA.

The weather, we believe, continues everything the planters could desire; occasional heavy showers, with hot suns intervening, are giving an immense growth to the canes, and induce the hope of large returns at the end of the year. Very little sugar is being made at present, nor is there much expected to come forward until October, when the busy season will commence, and last till Christmas. As we have already remarked, the crop is not likely to exceed that of last year, but will probably equal it. We believe, however, that there will be a larger number of acres cut this year than in 1879.

We note that an invention by Mr. Charles Williams, chemist on the Bel Air estate, Demerara, for the filtering of cane juice, has been provisionally protected for 12 months under the Patent Ordinance.

Correspondence.

THE BONNEFIN FILTERS.

To THE EDITOR OF THE "SUGAR CANE."

Sir,

I have read, in your two last issues, the letters you published regarding Mr. Bonnefin's process of filtration, and having had, for many years, to filtrate syrups and juices of all kinds, and having given a great deal of attention to filtration generally, I crave for a little space in your next issue to enable me to answer your correspondent Mr. Remmers' letter from a perfectly independent point of view. The idea of applying capillary action to filtration appeared to me so good that I communicated with the inventor, Mr. Bonnefin, who kindly gave me all the information I desired, and I can assert, from personal observation, that capillary filters will not only produce perfect quality and maximum quantity of juice, in the manufacture of sugar, but also will afford to all industrials the means so long sought for of clarifying their refuse liquids.

Before answering, one by one, the queries of Mr. Remmers, who evidently does not understand the action of a capillary filter, it is necessary for me to point out what that action is and what is the difference between a filter acting naturally, through capillary attraction, and one acting under compulsion.

I dare say Mr. Remmers has, at one time or other of his busy life, seen how a few drops of any fluid, dropped between two glass rods placed close to each other and suspended in the air, will run along the two rods and only fall at both ends. The same action takes place between all the fibres composing Bonnefin's filtering cloth; the fibres, in fact, form a great number of small channels through which the liquid gradually passes. To give another example of capillary action to Mr. Remmers, I have only to ask him to put on his coat a teaspoonful, or more or less according to his liking, of slush and examine what will take place. He probably will be able to notice that in an incredible short time a wet circle will have been formed round the point where the muddy liquid was placed, the solid part, of course, remaining stationary, whilst the fluid

portion passes through his coat within a circle of three or four times more diameter than the original circle had. Such is the action of a capillary filter.

In an ordinary filter, which is acting under more or less pressure, the action is mechanical, but not natural. In the first instance, the filtering cloth has to be made sufficiently strong to resist the power applied, and the greater the pressure the narrower must be the interstices of the fabric. Each interstice is made, by the force applied, to swallow more than it properly can in a given time, and consequently the juice has to be clarified several times because some vegetable albumen and insoluble matters, in fact impurities, have been compelled to pass along with the saccharine juice. This undeniable fact brings me to tell Mr. Remmers that, contrary to his opinion, the facts stated in the letter of Mr. Poculot have a perfect and clear bearing on the question, and convey sufficiently well the merits of Mr. Bonnefin's filter to any well-balanced mind, as it stands to reason that juice which has remained so long free from putrefaction must have, in the first instance, been entirely deprived of all putrescible matters, and, I have no hesitation in saying, that no such result can take place with juice filtered *only once* by compulsion, if it ever can take place at all.

Now, having shown the difference between capillary and compulsory action in a filter, I dare say that Mr. Remmers will see that the data he puts down as necessary to the proper comparison between the capability of a Bonnefin and that of a press filter are completely misleading.

However, to satisfy Mr. Remmers' natural curiosity, I will take his queries singly :—

1. Whether Bonnefin's filters are in actual use, or not, needs not trouble me. If they are not, they ought to be, because they are based on a perfectly sound theory, easy of application to any extent. In an ordinary press filter the filtering surface is equal to the surface of the cloth; in Mr. Bonnefin's filter the filtering surface is only equal to the trifling surface of all the fibres composing the matting or fabric placed between his rings put together.

2. The quantity filtered per hour is equal to 12 times the capacity of the filter. Taking a 50-gallon filter for example, the

quantity of juice filtered would be 600 gallons per hour, *entirely clarified*, and necessitating no further treatment except concentration and crystallization.

3. The filtration in Bonnefin's system being a continuous flow of pure juice, there is no need for further answer to this question.

4. This query is also answered by the very march of the system.*

5. The liquor extracted by a capillary filter is, of necessity, uniform in specific gravity, and constitutes, of necessity, the whole of the saccharine juice of the cane.*

6. I leave to Mr. Remmers to calculate what the cake can be when the whole of the juice of the cane is extracted.

7. It will surprise Mr. Remmers to hear that there is no necessity of lixiviating the cakes, as no juice remains behind.

8. There is no necessity for that.

Now, sir, to bring to a conclusion this perhaps too long letter. It does not follow that, because a new filter has not been or is not actually in extensive use, it is not successful. The best contrivances, based on sound principles, generally speaking, take more time to strike roots than ordinary ones, simply because their action, in nine cases out of ten, is contrary to ideas generally entertained, though less easily understood by the general public. If sugar refiners or planters do not come to see that with a filter acting by capillarity, whether of Mr. Bonnefin's or of anyone else's make, they will secure the entirety of the juice of the cane, and, moreover, *ipso facto*, do away with a great deal of unnecessary labour in the process of refining sugar, it will speak a great deal more in favour of the fixity of their minds than in favour of the subtleness of their intelligence.

I remain, sir, yours truly,

A. VASSARD,

Member of the Chem. Soc. of Paris,

Late Expert Chemist to the Board of Trade, etc.

16, Annandale Road, West Combe Park, Greenwich.

* Mr. Remmers appears to have entered the arena against Bonnefin's filter in complete darkness as far as its *modus operandi* is concerned. The cloth is changed from time to time when it is covered with gummy matters, but without interrupting filtration for more than a very short time.

FOR INTENDING EMIGRANTS TO DEMERARA.

To THE EDITOR OF "THE SUGAR CANE."

SIR,

In your September number you communicate to your readers a "Caution for intending emigrants to Demerara," from one of your correspondents in that colony; the emigrants for whom this "Caution" is provided being those who purpose becoming overseers.

Your correspondent, I presume, is an overseer, and may be one of those dissatisfied gentlemen we find in many callings. As I know something of the colony, I have to beg you will allow me a small space in your Magazine to endeavour to disabuse the minds of those who may possibly be misled by his assertions as to the general existence of a state of things, that, if actual, would justify the "Caution." That a few isolated cases might be pointed to as justifying your correspondent's report, I dare say, is possible, but no good overseer need long submit to such, as good men have no great difficulty in getting on an estate where they will not have much to complain of.

That Demerara is an expensive place I do not for a moment deny, but if so, incomes of all classes are usually proportionately high, when we compare the various occupations and remuneration in the colony with the like elsewhere.

It must be borne in mind that overseeing is, after all, a mere service of apprenticeship to a calling that leads to some of the best appointments in the colony—other than official—to the man who brings to bear a moderately fair amount of intelligence, steadiness, and energy, with a determination to win. That there are such results from these qualities is shown by the fact that many of the leading men in the colony, and others occupying respectable, responsible, and important positions, commenced their career as overseers, and won their way up by their own merit and not by interest.

An overseer usually commences with a salary of about £50 per annum, with board, washing, medical attendance, and lodgings—in some cases furnished, but more frequently not. £10 to £15

will supply all furniture needed for reasonable comfort—taste and pocket must dictate as to further. The salary goes on advancing up to £100 and over; occasionally, on large estates, to £200 per annum. On some properties this advance depends on vacancies occurring in the staff, when the junior gets a step up. On others it is given after a year's service, if merited; while some do not wait for the year's service if merit claims it sooner. From his salary an overseer—after the first year, though some do it the first—can save a little, and this without going in for the *hugga-mugga*, either in his person or his room, or yet precluding a little outlay on the *weed*, if so disposed, and a few dollars for the purchase of books.

I admit an overseer has hard work and not much in the shape of recreation, but he has an easier time of it than the young sailor, and his prospects of promotion—if he only apply himself with a will—are, I believe, very much better.

If your correspondent, instead of mooning over dinner being late, and his salary being at the bottom of the ladder, will only bestir himself, look out for a more suitable estate than the one he is on appears to be, and work both head and hands, he will find he will not fare so badly as he would have his friends suppose. Let it not be forgotten that steady pressure is pretty sure to get the load to the top of the hill, but beware of the bottle, which has marred the prospect of many a young man.

Your obedient servant,

London, 8th September, 1880.

K.

'MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

3328. FREDERIK WOLFF, of Copenhagen, Denmark. *Improvements in centrifugal extracting or separating machines.* (A communication from G. A. Hagemann, of Copenhagen, Denmark.)

3361. ALBERT SAUVÉE, 22, Parliament Street, Westminster, Middlesex. *Improvements in the process of refining sugar.* (A communication from Emile Commerson, of Marseilles, France.)

3550. FRANCOIS ALCIDE BONNEFIN, of Leadenhall Street, London. *Improvements in preparing, evaporating, and concentrating saccharine juices or other liquids, and in apparatus employed therein.*

ABRIDGMENTS.

479. THOMAS JAMES SMITH, of 166, Fleet Street, London. *Improved apparatus for effecting continuously, by the diffusing process, the extract of the juices from beet-roots, sugar canes, dye woods, and all extractive matters generally.* (A communication from Emile Charles and Alfred Perret, of Roye, department of the Somme, France.) This apparatus consists principally of a perforated cylinder, inside which is fixed a spiral or helical screw, also made of perforated metal. This cylinder revolves in a vat or drum, and is caused to carry the substance to be diffused in the reverse direction to the flow of the diffusing liquid. The vat or drum and the screw cylinder are provided with water-tight partitions, at least one to each spiral of the screw, dividing the apparatus into compartments which may be said to represent the vats of the German diffusion apparatus. The water enters by a tube provided with a cock, and float to regulate the level of the diffusing liquid, and the juices flow out at the opposite end into a testing apparatus. To raise the liquid to the necessary temperature, a coil of steam pipe is arranged at the sides of the apparatus between the vat or drum and the cylinder, the pipes being placed at the second quarter of a length of the cylinder, beginning from that end at which the substances for diffusion are introduced.

572. HERBERT JOHN ALLISON, of 41, Southampton Buildings, Holborn, Middlesex. *An improved apparatus for the maceration or steeping of beet-root in the manufacture of sugar.* (A communication from Sylvère Lobry, of Paris, France.) This is an apparatus to be employed after the pressure upon the pulp by the preparatory table and before the sacks or bags containing the said pulp are placed in the hydraulic press. It consists of a metallic box fixed on the preparatory table, and of a length and width equal to the sacks or bags (about $17\frac{3}{4}$ inches wide, $25\frac{1}{2}$ inches long, and $\frac{3}{4}$ to $1\frac{1}{4}$ inch high). A pipe, provided with a tap or cock within reach of the workman, is adapted to one side of this box, the bottom of which is perforated, so that the pressure is exerted on all parts of the bag or sack inside the apparatus. The bags are placed one by one in this box before being placed in the hydraulic press.

(These two inventions received Provisional Protection only.)

AMERICAN.

231,638. WILLIAM H. WIESTER, of San Francisco, California. *Sugar moulding machinery.* This invention relates to the class of sugar-moulding machines on which the moulds are placed on the periphery of a revolving wheel. Each mould on this revolving wheel is provided with a sliding bottom, having a stem extending inwardly towards the axis of the mould.

wheel. Immediately above this wheel is placed a cylindrical feed box, inside which is a vertical pressing screw, the revolving of which presses the sugar into the mould beneath. An opening in the feed box, provided with a regulating gate, prevents the screw from feeding too much sugar into the moulds, as the surplus sugar may escape from this opening after the moulds have been sufficiently packed. The filled moulds then pass from the feed box and are emptied, when their open ends are downwards, on to travelling plates beneath. This is accomplished by the inwardly projecting stems coming into contact with a fixed roller inside the wheel, and being forced outwards thereby with their sliding bottoms. In order to clear off any sugar adhering to the sliding bottom they are held in this position by a fixed plate inside the wheel for about a quarter of a revolution, during which period they pass a revolving brush and a revolving cloth-covered roller, which latter is sufficiently damp to wipe off any sugar still adhering to the mould-bottom after it has passed the brush. This cloth-covered roller revolves in a trough of water, superfluous moisture being pressed from it by another roller covered with india-rubber, which leaves it just sufficiently moist to clean the mould-bottom. As soon as the stems of these sliding bottoms have passed the curved plate a bar provided with projections corresponding with the moulds is caused to move inwards and push in the sliding bottoms ready to receive the sugar from the feed box as they pass beneath. The pressing screw is driven from the top by a bevel wheel on its shaft gearing, with a pinion on the driving shaft of the machine. This pinion is on a sleeve which slides on a feather on the shaft, and this sleeve is held in position by a hinged cap or collar between it and the framework of the machine. But when the cap or collar is lifted the sleeve may be moved backwards, drawing the pinion out of gear with the bevel wheel. The moulds may then be moved round for cleaning or repairs, without being filled with sugar.

SUGAR STATISTICS—GREAT BRITAIN.

To SEPT. 18TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.	
	1880.	1879.	1880.	1879.	1880.	1879.
London	86 ..	88	235 ..	258	223 ..	215
Liverpool	40 ..	60	165 ..	209	169 ..	173
Bristol	3 ..	5	39 ..	44	38 ..	41
Clyde	48 ..	62	190 ..	215	175 ..	185
Total ..	177	215	629	726	605	614
Decrease..	38		Decrease..	97	Decrease..	9

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST AUGUST, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
203	68	23	10	2	306	362	308

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST AUGUST, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other entrepreneurs	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
980	314	33	288	206	1821	1781	1695

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1880-81.	1879-80.	1878-79.	1877-78.
	Tons.	Tons.	Tons.	Tons.
France	425,000 ..	275,000 ..	432,636 ..	398,132
Germany (Zollverein)	500,000 ..	410,000 ..	420,684 ..	383,828
Austro-Hungary	410,000 ..	370,000 ..	405,907 ..	330,792
Russia and Poland	235,000 ..	225,000 ..	215,000 ..	220,000
Belgium	70,000 ..	55,000 ..	69,926 ..	63,075
Holland and other Countries	30,000 ..	25,000 ..	30,000 ..	25,000
Total.....	1,670,000	1,360,000	1,574,153	1,420,827

STATE AND PROSPECTS OF THE SUGAR MARKET.

The month opened with an improvement in the prices of refined sugars; raw sugar, and especially the lower qualities, did not share in this improvement, and the month closes with an advance of from 9d. to 1s. per cwt. on loaves, and with a decline of from 6d. to 1s. per cwt. on raw sugars.

The near approach of the beetroot supply, and the expectation of a large increase over that of last year, has caused refiners to be very cautious in their purchases of raw cane sugar, and business to be restricted to immediate needs. This caution has caused the decline we note in the price of raw, and we cannot anticipate any improvement until the real prospects of supply are freer from doubt.

The imports in 1880, as compared with those of 1879, show a decrease of about 97,600 tons, against a decrease of about 77,100 tons shown last month.

The deliveries, which last month showed an increase of 2400 over those of 1879, show now a decrease, as compared with those of 1879, of about 9100 tons.

The stocks of sugar on the 18th September were about 38,300 tons less than at the same period in 1879.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 21s. 6d., to 22s., against 22s. 6d. to 23s.; good to fine grocery, 22s. 6d. to 25s. against 23s. 6d. to 25s. 6d.; Martinique crystals, 25s. 6d. to 26s. 6d., against 26s. 6d. to 27s. 6d.; No. 12 Havana, 24s. to 24s. 6d., against 24s. to 24s. 6d.; fair to good refining Cuba Muscovados, 21s. 6d. to 22s., against 22s. 6d. to 23s.; middling to good brown Bahia, 18s. to 18s. 6d., against 19s. to 19s. 6d.; good to fine Pernambuco, 18s. 6d. to 19s., against 19s. 6d. to 20s. 6d.; Paris loaves, 29s. 3d. to 30s., against 28s. to 29s.

THE SUGAR CANE.

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NOVEMBER 1, 1880.

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 The writers alone are responsible for their statements.

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PUBLIC MEETINGS ON THE EXPORT BOUNTY QUESTION.

The foreign export bounties are more than ever the burning question in the sugar trade, and have now become a subject of general political discussion which promises to be of no little importance and interest during the coming session. We do not hesitate, therefore, to devote a considerable portion of our space to a careful selection of such intelligence on the subject as will most interest our readers.

During the past month six public meetings have been held in furtherance of the movement for the abolition of foreign export bounties. The meeting at Greenock on the 7th of October was of more than usual importance, the report of the proceedings filling nearly nine columns of the local papers. It is stated that between three and four thousand people were present, which clearly indicates that the subject is one of no small interest in that part of the country. The Provost presided, and was supported by the Member for the Borough and by many leading men connected with the shipping and sugar refining industries of the town, as well as by Delegates from the Trades' Societies of Glasgow, Paisley, London, Bristol, Edinburgh, and Greenock. Others, who were unable to attend, wrote very strongly in support of the movement. The Provost of Gourock wrote that the great danger was that our Government would "dilly dally" too long, and then

shut the door when the steed was stolen. Mr. William Holms, the member for Paisley, wrote that the question was one affecting employers and employed, and against which our Government should protest in the most vigorous manner. Mr. J. H. Carmichael wrote that he would cordially co-operate in the adoption of such measures as would secure "a fair field and no favour" for every industry in the kingdom. Dr. Cameron, the member for Glasgow, wrote that he desired "to assist in the protest against a system of veiled attack upon our industries and commerce, which threatens speedily to be brought to bear on branches of trade of more vital importance to the nation at large than that to which it is at present practically confined." The Chairman, Provost Campbell, clearly pointed out the effect of export bounties, and asked whether British producers were to wait till they were ruined. He supported the proposal of a countervailing duty on free trade grounds, and showed that there was nothing new in the principle of such a measure. The resolutions, which we give in another column, were very ably moved, seconded, and supported by Mr. G. Ferguson, Secretary of the Greenock branch of the Amalgamated Society of Engineers; Mr. Howie, Secretary of the Glasgow branch of the Workmen's Association; Mr. James Stewart, M.P.; Mr. Kelly, representative of the Workmen's Society in London; Mr. M'Lean, Secretary of the Scottish Central Committee; Mr. Alexander Scott, jun., Chairman of the Scottish Sugar Refiners' Association; Mr. David Campbell, representative of the Glasgow Trades' Council; Mr. Thomas Neill, Secretary of the Scottish Sugar Refiners' Association; Mr. Peters, of Bristol, Secretary of the Workmen's National Association; Mr. Rothwell, delegate from the Boilermakers and Iron Ship-builders' Society; and Mr. James MacCunn, shipowner. Mr. James Stewart, the member for Greenock, said that, as member of the Parliamentary Committee on Sugar Industries, he had been present at each meeting of the Committee at which evidence was taken, and he was convinced, as a free trader, that a countervailing duty was by no means contrary to the principles of free trade. He pointed out that though we could not compel foreign nations to remove prohibitive duties, we had it in our power to

prevent foreign protection on exports, by putting on a countervailing duty which should simply bring the article up to its natural price. Raising difficulties as to the exact amount of the bounty might, he thought, answer very well the purpose of those who want to argue strongly against it, but in a practical country like this it had no great weight, for it was perfectly clear that they could put on such a duty as would undoubtedly countervail the bounty, and they would very soon find that the bounty would no longer be given. As coming from a member of the Select Committee, this is an important statement. Mr. Rothwell stated that he was authorised by the Executive Council of the Boilermakers and Iron Ship-builders' Society to speak on behalf of the 18,000 members of the association, and to give the French bounties the strongest opposition. In an eloquent speech he reviewed the whole question of the effect and result of bounties, and the policy which should be adopted in reference to them. Quoting the memorial of the Edinburgh Chamber of Commerce, he pointed out that the proposed French bounty on ship-building amounted to £17 16s. per cent. on every £100 of the cost price, equal to £3 on the gross tonnage of the vessel. On the Clyde, he estimated the total tonnage built per annum at 250,000 tons. On the Tyne, Wear, and Tees there were launched last year over 300,000 tons of shipping. The total bounty for the Clyde and East of England, not including the Humber, Mersey, Thames, East of Scotland, and Ireland ship-building districts, would therefore amount to £1,650,000. If this amount should have to be taken from the wages of the Clyde workmen, as suggested by Mr. Giffen of the Board of Trade, it would virtually mean a reduction of 30 per cent. from their wages. Mr. Rothwell declared that if the advice of the Board of Trade Statist were acted upon it would practically mean the closing of fourteen shipyards, each paying £1000 per week in wages, and that this means reduced profits to tradesmen. He, therefore, concluded that this great question involves all and touches the interests of all. Mr. Rothwell was followed by Mr. James MacCunn, shipowner, who gave some interesting details as to the proposed French bounty on navigation, the law

relating to which, he had good reason to believe, would be confirmed by the French Senate. This bounty, he stated, would amount to a net sum of £5,400 a year on a steamship and £2,500 a year on a sailing vessel. After paying all reductions and deductions, a steamship and a sailing vessel would earn in ten years a bounty of £46,000 and £21,000 respectively. So that at the end of ten years the State would have paid three-fourths of the cost of the ship. Reflecting merchants and traders view this with the utmost alarm, and already memorials have been addressed to Lord Granville by Shipowners Associations and Chambers of Commerce throughout the land, but he believed that no memorial can have so much weight with the Government as the voice of that great section of the people—the working classes—to whom the shipping interest is daily bread. Every resolution was carried at this large and influential meeting without a single dissentient voice.

A meeting of representatives of the trades of Glasgow was held in that town on the 8th October, at which deputations from the trades societies of London, Bristol, Greenock, Paisley, and other centres of industry were present. In reference to this and the Greenock meeting, an article appeared in that well-known Liberal paper, the *North British Daily Mail*, strongly in favour of the resolutions passed at those meetings. One of the speakers at Greenock, Mr. Thomas Neill, had pointed out how large a proportion of the local taxation was paid by those engaged in the sugar industry, illustrating the idea of the difference which the suppression of the trade would make to the ordinary ratepayers by showing that the domestic water rates would have to be advanced from 9d. to 2s. in the pound if the refineries were closed. This was referred to by the *Daily Mail* as showing how serious might be the consequences of a continuation of the bounties, the writer declaring that he was not only at one with Mr. Stewart, M.P., in thinking that there is nothing contrary to the principles of a sound political economy in the proposition to levy a countervailing duty, should no other remedy prove effectual, but that he would go further and say that a proposition of this kind is consistent not

only with the principles of true science, but with common sense. The writer goes on to point out that a prudent merchant, if he were opposed by a combination seeking by unfair means to drive him out of the trade, would at once resolve, at any risk, to prevent such a monopoly being established against him. The position of the British Government on the sugar question is, in the opinion of the *Daily Mail*, on all fours with that of the merchant in this case. As representing the people, who are the consumers of sugar, it is to the interest of the Government to prevent a monopoly being established in its manufacture, and this it "can most effectually accomplish by putting on a duty equal in amount to the bounty enjoyed by the foreign manufacturer."

At Paisley, a public meeting of working men was held on the 9th October, the president of the Paisley Trades' Council in the chair. At this meeting also, the resolutions were passed with unanimity.

The working men of Liverpool organised a most successful demonstration, under the auspices of the United and Shipping Trades' Council, on the 13th of October, at which Alderman W. B. Forwood, president of the Liverpool Chamber of Commerce, presided. He stated his belief that the greatest victory ever gained in this country in the past was when they unfurled the banner of free trade where the old banner of protection floated. Treating the question under consideration from this standpoint of a free trader, he said we could but regret that foreign Governments should persist in the policy of protective tariffs, and could console ourselves with the assurance that those tariffs were dealing a severe blow at the industries of those countries; but that the question of bounties stood on a higher footing. It was the introduction of a surreptitious system, an entire departure from the principle of fair play, a breach of good faith by those countries which had commercial treaties with us. He defended the recommendations of the Select Committee, and said, in reference to existing commercial treaties precluding the adoption of the policy of a countervailing duty, that such treaties were always open to revision, and that as the French treaties were now under that

process, the present was a favourable opportunity for effecting what was required. Coming from the president of the Liverpool Chamber of Commerce, this is an important statement, as showing that the great centres of industry and the leading Chambers of Commerce accept this view of the Select Committee, and are ready to act upon it by revising our treaties of commerce. Mr. Forwood declared that he not only denied the proposition that the principle of countervailing duties was contrary to the principles of free trade, but he thought that the proposed countervailing duties would be an absolute protection to free trade, and it was from that point of view that he supported the proposal. The resolutions were all passed unanimously, the only opposition being in the form of a letter from Mr. S. Williamson, M.P., who argued in favour of foreign bounties, on the ground that they reduce prices to the British consumer. He, therefore, disapproved of organised resistance to the foreign bounty system, though he advocated strong representations to the Government. It is difficult to understand what these strong representations are to be, if foreign bounties are so beneficial to the British consumers that they ought not to be meddled with. Mr. Williamson is convinced that if it were pointed out to the French Government that they are committing grave economical errors they would soon adopt a remedy. He is evidently unaware that the French Government have been informed by the British Government of these economical errors continually for nearly twenty years, and that they have fully admitted the facts, which have, moreover, been carefully inquired into by three or four official commissions, debated most fully in the National Assembly and Chamber of Deputies, and, finally, stated in great detail in the preamble to the new French law on the sugar duties. The same is the case with Holland, Belgium, Germany, Austria, and the United States, and yet we do not find that these countries are disposed to remedy the evil quite so quickly as Mr. Williamson would imagine.

Birkenhead held a large meeting on the 15th of October, at which were represented the Birkenhead Trades' Council, the Liverpool Trades' Council, the Amalgamated Society of Engineers,

the Liverpool Gilders' Society, and other bodies of working men. Mr. MacIver, M.P., was the principal speaker, but fortunately did not damage the cause of Free Trade by any objectionable arguments. The advocates of the principle of a countervailing duty have obtained the adhesion of so many staunch Freetraders by the clear way in which they have taken their stand on well-established and indisputable principles, that they ought to be grateful to so pronounced a protectionist or reciprocitarian as Mr. MacIver for the careful way in which he has handled the bounty question. With regard to the political economy of the matter, he referred his hearers to Mill's principles, book 5, chapter 4; and Adam Smith's Wealth of Nations, book 4, chapter 2.

A large meeting was held at Leeds on the 18th October, at which Mr. George Shipton, Secretary of the London Trades Council was present. The meeting was convened by the Leeds and District Trades Council, the Vice-President of which Association, Mr. Hudson, occupied the chair. Several leading trades councils were represented.

Mr. Shipton made a very good speech. All that English traders asked, he said, was that in their own markets their own industries should be preserved from the insidious and unjust attacks of foreign export bounties, which enabled the foreign competitor to undersell them for the time being, to obtain a monopoly when he had destroyed their industry, and then recoup himself by increasing the price to the consumer. They were prepared for inequality of competition abroad, but not at home. A countervailing duty was a tax on the bounty, not on the article. When the bounties ceased the duty would cease. "If those who objected could tell them of any better method, he supposed they were not so confoundedly in conceit with their own opinions as not to accept it." This speech is of value as coming from so important a representative of British labour. Some little opposition was attempted at this meeting. This is occasionally desirable, as nothing is more calculated to confirm and support the movement than a periodical exhibition of the weak case of those who oppose it. This we had an opportunity of showing last month in examining the carefully-prepared report

of the minority on the Select Committee, which must be taken as an exhaustive statement of the case against the abolition of foreign export bounties. At the Leeds meeting the opposition was certainly not of a formidable character, and resulted in a show of about a dozen hands in favour of an amendment to one of the resolutions. The mover of the amendment regarded bounties as "wrong things, inasmuch as they give an unfair advantage," but thought that no foreign Government gave bounties. He maintained that "a countervailing duty would create a tax of some millions of money, simply for the purpose of saving fifty or a hundred thousand pounds." It is not clear to what amount he here refers as likely to be "saved" by a countervailing duty. It is, however, satisfactory to know that at large meetings of sugar consumers this view of the case appears to have no force. Among the letters of apology from Members of Parliament was one from Sir John Ramsden, M.P., in which he hopes that some remedy may be suggested "which is not open to the objection that it would inflict more injury on ourselves than on those whom it is intended to coerce." There is surely some little confusion of ideas here. The very best reason against what is called the reciprocity argument is that in levying retaliatory duties we are simply injuring ourselves, without in any way bringing about a remedy for the prohibitive tariffs of foreign countries. But in countervailing a bounty exactly the reverse is the case. Freedom of competition is restored to British producers on British markets; free access to all natural sources of supply is restored to the consumer; no tax is levied on the article, it is merely the bounty which is struck; and, if the article could continue to be exported to this country under natural conditions, the bounty, if maintained, would be secured in the form of revenue for the British Exchequer, paid out of foreign taxes. It is clear, therefore, that the principle of a countervailing duty would not be open to the objection to which Sir John Ramsden refers.

The following are the resolutions—evidently framed by the workmen's societies—which were passed at these meetings:—

RESOLVED—"That this meeting desire to record their detestation of the foreign bounty system. And, recognising in the principle of foreign bounties a deliberate and insidious attack upon our national industries, trade, and commerce, this meeting doth hereby declare that it is the bounden duty of all persons interested in the prosperity and well-being of the British Empire and her Colonial possessions to offer a strong and organised resistance to the continuance of the foreign bounty system, and not to cease all united efforts until a general abolition of the bounty system is attained."

RESOLVED—"That this meeting hails with great satisfaction the formation of the 'National Anti-Bounty League ;' and, recognising the 'League' as calculated to afford valuable aid to the efforts of all organisations now conducting the agitation against foreign bounties, resolves to give the Executive Council of the League its hearty sympathy and support."

RESOLVED—"That this meeting earnestly requests Her Majesty's Government to at once give effect to the recommendations contained in the recent Report of the Select Parliamentary Committee on British sugar industries, and strongly urges upon the attention of the Government the necessity of making their long-continued negociations for the suppression of the foreign bounties on sugar efficacious—pending an international settlement of the question—by the imposition forthwith of such a countervailing duty as will render the competition of the sugar industries of the world on the British market free and equal as regards all competitors."

RESOLVED—"That this meeting regards with grave apprehension the new French law which grants heavy money subsidies upon the shipbuilding and ship carrying trades of France, and begs to express its earnest conviction that such policy is a specious attack upon the naval supremacy of Great Britain by France, which, if allowed to go unchecked, will be fraught with the most serious consequences to the great maritime industries of Britain ; and, therefore, this meeting calls upon the Government to take such steps as will induce France to abandon such an aggressive policy, opposed to all international equity, and a clear violation of our treaties of commerce."

RESOLVED—"That the chairman of this meeting be authorised to sign the foregoing resolutions, and transmit the same to the Premier, the Foreign Minister, the President of the Board of Trade, the Leader of Her Majesty's Opposition in the House of Commons, the Borough and County Members, and the Executive Council of the National Anti-Bounty League."

THE FRENCH AND DUTCH EXPORT BOUNTIES ON REFINED SUGAR.

The following letters have been addressed to the Board of Trade :—

21, Mincing Lane,

11th October, 1880.

THE RIGHT HON. J. CHAMBERLAIN, M.P., President of the
Board of Trade.

Sir,

I am desired by the British Sugar Refiners' Committee to bring to your notice the new bounty on the exportation of moist refined sugar from France, which is established under the law which came into operation in that country on the 1st inst.

Letters on the subject have already been addressed to the Foreign Office by my committee on the 16th June and 28th of July last, copies of which are given in the Appendix to the Report of the Select Committee on Sugar Industries, at pages 87 and 89 of the Blue Book of 1880. As my committee are informed that the question of foreign export bounties on sugar is now in the hands of your department I am instructed respectfully to refer you to those letters, in which several points in the new French law seriously affecting the interests of British sugar refiners are dealt with in detail.

To one provision in the law, which threatens an immediate and direct attack on an important branch of the sugar refining industry of this country by means of a bounty on the exportation of moist refined sugar, I am desired again to direct the serious attention of Her Majesty's Government.

The duty on raw sugar is, under the new French law, assessed on the quantity of pure sugar it is presumed to yield, as estimated in the following manner. The quantities of crystallizable sugar, uncrystallizable-sugar (or glucose) and ash, having been ascertained by analysis, the ash, multiplied by four, and the uncrystallizable sugar, multiplied by two, are deducted from the crystallizable sugar.

A further deduction of $1\frac{1}{2}$ per cent. for waste is made, and the remainder is then taken as representing the yield, or quantity of pure sugar extractible from the raw sugar. On this estimated quantity the duty is assessed. The method of calculation is as follows:—

	Per cent.
Crystallizable sugar	86·5
Uncrystallizable sugar (or glucose)	6
Ash	1·5
Water and other substances	6
	<hr/>
	100

	Per cent.
Crystallizable sugar	86·5
Deduct twice the uncrystallizable sugar (6×2)..	12
	<hr/>
	74·5
Deduct four times the ash ($1·5 \times 4$)	6
	<hr/>
	68·5
Deduct 1·5 for waste	1·5
	<hr/>

Estimated yield on which duty is levied or debited.. 67

Moist refined sugar (called "pieces" or "vergeoises"), when presented for exportation, is accepted, in discharge of the debit of duty assessed on the raw sugar, for the quantity of pure refined sugar which it is presumed to represent. This quantity is determined in the same way, with the important and anomalous exception that no deduction is made for uncrystallizable sugar.

Taking, as an illustration, a moist refined sugar of the same composition as the raw sugar given above, the method of calculation is as follows:—

	Per cent.
Crystallizable sugar	86·5
Uncrystallizable sugar, or glucose	6
Ash	1·5
Water and other substances	6
	<hr/>
	100

Estimation of the Pure Sugar it represents.

	Per cent.
Crystallizable sugar	86·5
Deduct four times the ash ($1\cdot5 \times 4$)	6
Estimated quantity of pure sugar represented by the moist refined sugar	80·5

One hundred parts of the moist refined sugar are, therefore, accepted in discharge of a debit of duty on 80·5 parts of pure sugar, while 100 parts of exactly similar raw sugar are debited with duty on only 67 parts of pure sugar.

It is evident, therefore, that the use of such raw sugar and the exportation of such moist refined sugar will, by means of this remarkable provision in the new French law, enable a French refiner to discharge his debit of duty with a much smaller quantity of sugar than he really produces, and will thus leave him with a large quantity of refined sugar free of duty. The bounty on exportation is thus extended to moist refined sugar.

The amount of bounty to be thus obtained will be in proportion to the quantities of uncrystallizable sugar supposed to exist in the raw sugar used by the refiner and in the moist refined sugar exported by him. These quantities can be considerably in excess of those given in the above illustrations, and it would be easy to obtain from this new source a bounty of between two and three shillings per cwt.,—apart from errors in samples and analysis, by which all such export bounties on sugar can be indefinitely increased.

As the sugar-refining industry of this country is now principally devoted to the production of moist refined sugar it is of the utmost importance that this new defect in the French system should be brought to the attention of the French Government without delay, and I am, therefore, desired respectfully to urge that steps should at once be taken with that view.

I am, Sir, your obedient servant,

(Signed) GEORGE MARTINEAU,

Secretary, British Sugar Refiners' Committee.

21, Mincing Lane,
9th October, 1880.

THE RIGHT HON. J. CHAMBERLAIN, M.P., President of the
Board of Trade.

Sir,

I am desired by the British Sugar Refiners' Committee to lay before you the following statement in reference to the bounty on the exportation of refined sugar from Holland, and to add their earnest hope that Her Majesty's Government will make such representations to the Government of the Netherlands as may lead to the speedy abolition of so injurious a system.

The duties on raw sugar are levied in Holland according to an estimated yield of refined sugar.

This estimate is based on the colour of the raw sugar, as follows:—

1st class, Dutch colour standards,

1st class, Dutch colour standards,	Nos. 15 to 18	94 per cent.
2nd , ,	Nos. 10 to 14	88 , ,
3rd , ,	Nos. 7 to 9	80 , ,
4th , ,	below No. 7	67 , ,

It has been notorious for many years past that the actual yield is very much in excess of this estimate.

The refiners are allowed to discharge the debit of duty by the exportation of the estimated yield. They are, therefore, left with the excess yield free of duty, which thus constitutes a bounty proportionate to the amount of excess yield which they are able to obtain. This excess yield has been stated to amount to from 10 to 20 per cent. on sugars coming under the 3rd and 4th classes.

The Netherlands Government, in a law of 25th May, 1880, undertook to adopt measures for ascertaining the error in the estimation of the yield of raw sugars. It appears from newspapers just received that the Netherlands Government has found the actual yields of sugars of the 2nd, 3rd, and 4th classes to be 97·8, 94·4, and 87·4 per cent., and has fixed the limits of the classes at those figures.

The only effect of this enactment appears to be, that all sugars which yield up to 97·8, 94·4, and 87·4 per cent. respectively, will be classified and charged with duty as if they only yielded 88, 80, and 67 per cent. respectively.

Thus the bounties previously alleged to exist are now not only officially confirmed, but appear to be maintained and definitely legalised.

The amount of this legalised bounty can now be calculated, being the duty on the difference between the estimated yield on which the duty is based, and the real yield as now ascertained by the Dutch Government and fixed by law.

The duty on sugar in Holland is equivalent to about 22s. per cwt. of refined, and therefore the bounty, in shillings per cwt., is as follows:—

	Estimated yield.	Actual yield.	Excess yield.	Value of duty on excess yield, in shillings per cwt.
2nd class ..	88 per cent. ..	97·8 per cent. ..	9·8 per cent. ..	2·15 shillings.
3rd „ ..	80 „ ..	94·4 „ ..	14·4 „ ..	3·16 „
4th „ ..	67 „ ..	87·4 „ ..	20·4 „ ..	4·48 „

The proportion of each class of raw sugar used by the Dutch refiners is as follows,—the proportions used in 1876 being also given, in order to show how much the use of the lower classes, which give the highest bounty, has increased:—

	1880.	1876.
1st class	2·28 per cent. ..	5·23 per cent.
2nd „	13·33 „ ..	75·28 „
3rd „	77·86 „ ..	16·24 „
4th „	6·53 „ ..	3·25 „

The following table will, therefore, give the calculation of the bounty now obtainable, and the consequent loss to the Dutch Treasury, on an average yearly exportation of 65,000 tons of refined sugar, which, according to the estimated yield, is equivalent to 81,000 tons of raw sugar, or, according to the actual yield now ascertained by the Dutch Government, to 92,000 tons of raw sugar.

Class of Raw Sugar.	Proportion used, 1880.	Quantity per annum.	Estimated yield on which duty is based.	Actual yield now ascertained by Dutch Government.	Excess yield.	Value of duty on excess yield.	Legalised Bounty per annum.
1st Class. Dutch Colour Standards, Nos. 16 to 18.	2·28	2,097	Per cent.	Tons.	Per cent.	Per cent.	£
2nd Class. Nos. 10 to 14.	18·33	12,263	94	88	97·8	9·8	not given
3rd Class. Nos. 7 to 9.	77·86	71,633	80	94·4	14·4	2·15	not given
4th Class. Below No. 7.	6·53	6,007	67	87·4	20·4	4·48	26,365
							226,360
							26,911
							£279,636
				92,000			

It has been stated in evidence before the Select Committee on Sugar Industries that the Dutch refiners sell their sugar, by means of this bounty, considerably below cost price, to the great detriment of British manufacturers, and I am therefore desired respectfully to urge upon Her Majesty's Government the importance of immediate action in reference to this official announcement in Holland, which so fully confirms previous statements as to the amount of the bounty, and which appears now definitely to legalise and maintain it.

The unequal competition brought about by this bounty is daily becoming aggravated, owing to the constant increase in the use of those kinds of sugar which enable the refiner to obtain a maximum bounty. At the present moment Dutch loaf sugar is being offered in the English market, for delivery during the coming beetroot season, at prices with which it would be impossible for English loaf sugar to compete. This arises from the opportunity which will be afforded to the Dutch refiner, when the new beetroot sugar comes forward, of securing an abundant supply of the kinds of sugar capable of yielding very much in excess of the estimate on which the duty is based.

I am, Sir, your obedient servant,

(Signed) GEORGE MARTINEAU,

Secretary, British Sugar Refiners' Committee.

P.S.—I am desired to add that the Dutch Chambers are in the habit of commencing their session early in the autumn, and that therefore it is important that the Dutch Government should be communicated with without delay.

The enthusiasm with which the United States Commissioner of Agriculture has encouraged and aided the production of sugar from sorghum is well known. During the past year he has succeeded in securing forty-two different varieties of seed, all of which he caused to be planted in the grounds of the department for identification and for determination of the percentage of sugar in the stalks of each kind at various stages of growth. At present the Early Amber has attained the greatest development, and analyses of the juices have already been begun.

THE BOUNTY ON THE EXPORTATION OF REFINED SUGAR FROM AUSTRIA.

The following letter has been addressed to the Board of Trade:—

21, Mincing Lane,

19th October, 1880.

THE RIGHT HON. J. CHAMBERLAIN, M.P., President of the
Board of Trade.

Sir,

I am desired by the British Sugar Refiners' Committee to bring to your notice the result of the last beetroot season in Austria-Hungary, as showing how ineffectual are the efforts of the Austro-Hungarian Government to abolish the bounty on the exportation of sugar from that country so long as the present system of assessment is maintained.

The duty is assessed on an estimated quantity of roots, the estimate being based on the presumed capacity of the apparatus of the sugar factory to work a certain quantity of roots in the 24 hours.

This estimate has been gradually raised in recent years from 220 kilos. to 1100 kilos. per hectolitre, but the manufacturers have succeeded, by constant changes in their apparatus, to baffle the efforts of the Government, and to secure every year a larger bounty by continually increasing the excess over the estimated quantity of roots.

At the beginning of the last season, therefore, a very large addition was made to the estimated quantity of roots worked by the apparatus, the figure being raised from 1100 to 1800 kilos. per hectolitre of capacity,—an increase of considerably more than 50 per cent.

To meet this increase, the apparatus of the factories was again changed, and it was at once foreseen by competent judges, as explained in M. Jacquemart's Statement, at page 394 of the first Report of the Select Committee on Sugar Industries, that the bounty would consequently be maintained at nearly its former amount.

The result has shown that this was too moderate a forecast. In the preceding season, 1878-9, when the quantity of roots was estimated on a basis of only 1,100 kilos. per hect. of the apparatus, duty was received to the amount of 20,650,000 fl., while drawback was paid on the exportation of sugar to the amount of 18,960,723 fl., so that a small balance remained in the Treasury.

But in the season which has just closed, 1879-80, in spite of the large increase—from 1,100 to 1,800 kilos. per hect.—in the estimated quantity of roots liable to duty, the amount of duty actually received, on the basis of this new estimate, was only 19,469,765 fl., while the drawback paid on the exportation of sugar amounted to 20,843,127 fl., leaving a deficit in the Treasury of 1,373,362 fl. I give these figures without reference either to the minimum revenue now enforced or to the more recent legislation on the subject, because I only desire to show how completely the present system of assessment according to the estimated capacity of the apparatus, though constantly made apparently more stringent, fails to secure the Austro-Hungarian Government against a heavy loss. So long as the sugar exported receives the full drawback, on the assumption that it has paid an equivalent duty in the factory, there can be no security, under the existing system, against the payment of an export bounty, whatever arbitrary amount may be fixed as a minimum revenue.

The figures I have given fully confirm the anticipations expressed in my letter to the Foreign Office of the 1st of March last, to which I am instructed respectfully to direct your attention, together with subsequent letters on the same subject (Commercial No. 11, 1880, page 56. Report, Sugar Industries, 4th August, 1880, pages 87 and 88.) The actual quantity of beetroots worked and of sugar produced, in 1879-80, is in excess of the preceding year, the estimated capacity of the apparatus has been increased by 64 per cent., and yet the net revenue from this method of assessment, instead of increasing in the same proportion, has decreased from a gain of 1,689,278 florins in 1878-9 to a loss of 1,373,362 florins in 1879-80.

The sugar consumption in France amounts to at least 280,000

tons per annum, and in the German Empire it rather exceeds that figure. An estimate of 200,000 tons, as the consumption of the Austro-Hungarian Empire, would therefore appear to be well within the mark. The Austro-Hungarian Exchequer should therefore receive from sugar, at the present rate of duty,—which, it must be recollectcd, is actually paid by the consumer,—a revenue of at least 23,000,000 florins. Instead of doing so it has this year lost 1,373,362 florins, and has only remedied the evil by levying a supplementary tax on the manufacturers, whereby it has secured a minimum of 6,500,000 florins, thus allowing at least 16,500,000 florins to remain in the hands of the manufacturers as export bounty. The sum of about 23,000,000 florins is actually paid as duty by the consumers of sugar in Austria, but the greater part fails to reach the Treasury.

In the letter to which I have referred I stated, as reasons why the Austrian bounty now seriously affects the interests of the British sugar refiners,—first, the great and rapid increase in the exportation of bounty-fed refined sugar from Austria; and, secondly, the fact that so long as the Austrian bounty continues, it is impossible to obtain the abolition of export bounties in other countries. In reply to this, it was pointed out, in a letter addressed to me from the Foreign Office on March 31st, that a comparatively small amount of Austrian refined sugar goes to the English market. I am desired to say, in reference to this, that the injurious effect on British industry of a bounty-fed exportation of foreign sugar is to a great extent independent of the direction which that exportation may take. Wherever such sugar may go, it is sure to be sold below the natural cost of production, and thus to affect natural prices throughout the world. It supplants sugar from other quarters, and thus compels producers in other countries—in this case, those in France and Holland, who had previously monopolized the export trade by means of bounties—to have increasing recourse to British markets.

The letter addressed to me from the Foreign Office also directs attention to a report on the subject of the Austrian sugar duties, enclosed in Sir Henry Elliot's despatch of March 4th. In this able

report Mr. Welby says that the Austrian Government is not disposed to adopt the system of working in bond, as far too costly, owing to the number and wide extent of the factories; that the whole industry is in the hands of influential landed proprietors whose influence is paramount in the Chambers; that the members of the Committee appointed to inquire into the question are for the most part specially interested in the manufacture; that it is quite certain, should the bounties be removed, that the whole industry would at once fall to the ground; but that, nevertheless, it would seem desirable that the bounties should be reduced, as giving an unnatural impetus to the growth of an industry so entirely dependent on protective duties. Mr. Welby gives the details of the changes proposed by the manufacturers "through fear of the possible increase of the present number of factories,"—changes which have since formed the basis of the new law. But Mr. Welby adds that even double the amount now proposed by the manufacturers might probably be returned without any serious injury to their interests.

In reference to this report, which on many points so completely confirms the representations made from time to time to Her Majesty's Government on the subject, I am desired to point out that the difficulty put forward by the Austrian Government as standing in the way of the adoption of the system of working in bond,—namely, its costliness, owing to the number and wide extent of the factories,—has no practical foundation. This is proved by experience in France, where similar factories are all worked in bond, though they are much more numerous and quite as widely extended as those in Austria. The cost is not found to be at all serious, and is fully justified by the absolute security to the revenue which is insured. It is, moreover, a system which the manufacturers have frequently stated to be in no way vexatious to them. The resolutions passed in the Reichsrath on the 13th of May, and the debate which took place on the subject (Report, Sugar Industries, August, 1880, page 102), show that the influence of the industry in the Chambers, and on the Committee to which the matter had been referred and by which the original resolutions were prepared, has not been so powerful as was anticipated. The Committee proposed that a Bill

should be brought in by which "the tax should be exclusively imposed on the sugar when ready for consumption,"—in other words, that the sugar should be manufactured in bond. This formed one of the resolutions ultimately agreed to, which further declared that the removal of bounties in other countries should be sought for by international negotiations. Both the Committee appointed to examine the question and the majority of the Reichsrath, therefore, desire the adoption of the system of manufacturing in bond; and the majority also desire a general abolition of bounties by treaty. In the course of the debate the existing system was spoken of as resting on a basis which can only be considered temporary, and which must be reformed, those sound conditions being introduced into it which the interests of the State call for.

In bringing these points to the notice of Her Majesty's Government, I am desired to express the hope that such representations may be made to the Austro-Hungarian Government as may lead to action being taken on the resolutions of the Reichsrath without delay.

I am, sir, your obedient servant,

(Signed) JAMES DUNCAN,
Chairman, British Sugar Refiners' Committee.

THE NATIONAL ANTI-BOUNTY LEAGUE.

On the 28th of September last, a Conference, presided over by Sir GEORGE HENRY CHAMBERS, Chairman of the London and St. Katharine and Victoria Docks, was held at the Westminster Palace Hotel, for the purpose of considering the basis upon which a National League might be formed to oppose the continuance and development of the Foreign Bounty system. The Conference was attended by many of the leading merchants and manufacturers of the city, representatives of several great houses of business, and working men's delegates from various important Trades' Societies. Among those present were:—Mr. Nevile Lubbock, Mr. Quintin Hogg, Lieut.-Colonel Cowan, Mr. M'Connell, Mr. Joseph Bravo,

Mr. Benjamin Bovell, of Barbadoes; Mr. Wallwyn P. B. Shepheard, Barrister-at-Law; Mr. Ohlson, Mr. H. W. Challis, Barrister-at-Law; Mr. John Monteith, President of the London Coopers' Association; Mr. C. H. Quinton, General Secretary of the London Coppersmiths; Mr. S. Peters, General Secretary of the Sugar Operatives Association; Mr. George Shipton, Secretary of the London Trades Council; Mr. William Jack, Representative of the Workmen in the East and West India Docks; Mr. St. Leger Gillman, Secretary of the Hand-in-Hand Society of Coopers; Mr. T. M. Kelly, Secretary of the Dock Labourers and Warehousemen Society; Mr. J. Willson, Secretary of the Shipwright's Provident Union; Messrs. Wiginton and Griffiths, Amalgamated Society of Watermen and Lightermen; Mr. Culwick, Coopers' Association; Mr. George Jones, Delegate of the Workmen, London Docks; and representatives from the Shipwrights, Charcoal Burners, Hoop Binders, Carters, and several others.

The CHAIRMAN (Sir George Henry Chambers), who, on rising, was received with much applause, in opening the proceedings, said that for some years past successive Governments, no matter how they were composed, or of what politics, had endeavoured by all means in their power to correct what was now known to be a serious evil. There had been international councils and conferences and various other negotiations going on, but, notwithstanding all means that had been hitherto adopted, up to the present time nothing, positively nothing, had been accomplished to remedy the evils complained of. Now, what were those evils? The chief of them was the pernicious system of certain foreign nations, by which bounties were allowed on goods manufactured in their country when exported into this. That system had been injurious to many branches of industry carried on in this nation. Not only had this country itself suffered through their operation, but our colonies had also been deeply injured by them. The question now was, how were they to be obviated? The reason why nothing had been done up to the present time for the purpose of getting rid of these bounties was because public opinion—that was to say, *outside* public opinion—instead of being with the Governments, had been

against them. That, he considered, had a most enervating effect upon the various Administrations which had been in power. (Hear, hear.) Had the Government been supported, the great majority of the people of this country who did not agree with bounties would now be in a very much better position, and there would have been no necessity for the formation of an Anti-Bounty League. The reason why public opinion was somewhat averse to the programme which they intended to carry out was owing in a great measure to many misstatements which had been made for the object of inducing the general public to believe that a remedy for these admitted evils would involve a return to protection. Nothing, however, could be more erroneous. Let them look back to the time when the apostles of Free Trade came forward for the overthrow of Protection, and upheld that the natural course—(hear, hear)—of supply and demand should not be interfered with by any fiscal regulation; that where articles could be most advantageously produced there they should be produced unimpeded by any State regulations that would tend to disturb the natural course of production. That was the first idea of the Free Traders, and the promoters of the League upheld those opinions, and every attempt now should be made to resist any system which had for its object the overthrow of such principles, even, as regards an export bounty, to the extent of imposing a countervailing duty. (Cheers.) In the House of Commons statements were made by those who were inimical to any alteration being made in the foreign bounty system, that the object of those who wished to get foreign governments to dispense with bounties was to obtain such a rate of duty imposed on bounty-fed sugar as would enable our producers to get a higher price for their produce than they did now—a higher price to the extent of the bounty, but those statements had been disproved. What they did propose was that our national and natural industries should not be opposed by unfair State-aided competition. Some of our ablest statesmen had put forward their opinions that the effect of this system, if maintained, must result in a monopoly for the bounty-giving States, and consequently in permanently higher prices; that would destroy the

true principle of Free Trade, and be a return to the evils of Protection. Such statements as these were well worth taking into consideration. It was known that one effect of this unfair system had been to destroy almost entirely the loaf sugar trade in this country, and seriously to affect the sugar production in the West Indian colonies ; but the evil was not limited to this class or that class—to sugar production or to any other one production. There were many other trades involved in the question, and only recently, with regard to the shipping industries, a proposal had been put forward by the French Government to inflict on this interest a serious evil. If this bounty system affects the great sugar industry and the still greater shipping industry, how long would it be before it would affect many others, and where would it stop ? Under such circumstances, and seeing their trade vanishing from them by degrees, they must do all that legitimately lay in their power to put a stop to the mischievous effect of this system of foreign bounties. The way to do it was to educate public opinion by getting sound views widely promulgated by the League, and inducing all classes to unite to do their utmost to abolish this system. (Loud cheers.) Then they would not have to deplore the continuance of a system which had been the means of throwing thousands out of employment and of seriously crippling the commercial prosperity of this country in the past and injuring its prospects in the future. (Cheers.)

MR. NEVILLE LUBBOCK moved the following resolution : "That this conference of representatives of capital and labour hereby declare their conviction that it is their duty to offer an organized resistance to the continuance of the foreign bounty system, and to promote within the national markets that free trade competition which secures to all competitors, whether home or foreign, the fullest enjoyment of their natural advantages." He said he looked upon it as a favourable augury that labour was so well represented at the meeting. The objects of the League were to obtain free trade in British markets and arbitrary and artificial aid to none. (Hear, hear.) Free trade had been seriously interfered with by the bounties given by foreign countries. Under free

trade, production would flow in those natural channels where labour can be employed to the best advantage. Bounties on the contrary drive production out of such channels into artificial ones where the increased amount of labour, rendered necessary, was paid for by foreign governments out of the taxes of their people. (Cheers.) The removal of bounties would therefore restore free trade. There were two ways in which bounties could be kept off British markets. Either foreign governments could cease to give them, or the British Government could remove them by means of countervailing duties. The League would be satisfied with either remedy, although in the interests of the community the countervailing duty would be the preferable one, inasmuch as any bounty given by a foreign government would then be paid into our exchequer. (Cheers.) The acquiescence of this country in bounties rendered insecure every British industry, and where uncertainty and insecurity existed capital would not be found, and the labourer would seek employment in vain. (Hear, hear.) The League did not intend to propose any action which should have any other effect than the cessation of bounties would have—(hear)—Consumers could not in the long run benefit by having natural sources of supply destroyed, and relying on sources dependent for their maintenance on foreign caprice and folly. It had been said that a countervailing duty on sugar would raise the price of the article one farthing per lb., but not one tittle of evidence had been brought forward in support of such an assertion—(hear, hear)—it was a statement which was not true. The restoration of free trade by the imposition of countervailing duties would once more enable capital to flow in those channels from which bounties were driving it, and honest toil would once again reap its due reward. (Cheers.)

MR. W. P. B. SHEPHEARD seconded the motion, and in doing so said it gave him considerable pleasure to see so many persons present who were interested in the great question of free trade. They had not met for the purpose of helping any one particular industry, but they had assembled that day to show that there was a *bond fide* union existing between capital and

labour for the bringing about of a given object—(hear, hear)—namely, to form themselves into a league for the purpose of getting rid of foreign bounties. They had, he thought, defined the objects of the League with as much precision as language would permit them to do. There were, he was glad to see, in the proposed executive council of the League skilled representatives of labour, gentlemen representing capital, and some members of his own profession—the law—all ready to lend their aid to the movement and take part in any controversy which might arise. (Hear, hear.) Whilst they required all the help they could get, still at the same time it would not be advisable for any who feared hard work to enroll themselves on the executive council. There would be a great battle to fight both on the platform and in the press, therefore none but those who would enter heart and soul into the conflict should join the council. (Hear, hear.)

MR. GEORGE SHIPTON, secretary of the London Trades' Council, supported the resolution. He said he rose with much pleasure to support the resolution, and his only motive in doing so was to defend the interests of his own order from what appeared to him to be a most unjust attack. (Hear.) It was not the first time he had committed himself to the principle in support of which they had met there that day. Early in the year when he was engaged in a political contest he had given in his adhesion to the principle of a countervailing duty. (Hear.) That was the principle he believed the League was fighting for—(hear)—and had he been returned to Parliament he certainly should have voted in favour of such a duty being levied. He had taken part in most of the great political questions which had agitated the public mind of late years, and as a consequence knew something about the wants and requirements of the people. The bounty question was undoubtedly a great one, and it seemed to him that that question had gone beyond the region of debate. It now rested with the country and the Council of the League to force the Government to do something. There should be a remedy found out for such a monstrous evil, but it was not for the League to say what that remedy should be. That was a question for the Government. (Hear,

hear.) It was true, a practical cure for the evil had been pointed out to the legislature, but if they did not like to accept it they should in all fairness propose one of their own. (Hear, hear.) Some persons imagined that the object of the League was to entirely upset the principle of free trade. Those persons who thought that knew nothing of the question, in fact it was the greatest rubbish. All that was wanted was to make the markets free. (Hear.) Protection was entirely out of the question. (Hear, hear.) Other sapient persons were running about saying, "Oh, we must get all articles of consumption as cheaply as we can." To such persons as those he would say they were economically blind. Such a doctrine, moreover, was immoral, and if followed out in its entirety by England it would be the means of depriving her of one of the brightest jewels in her diadem. This country had spent millions in putting down slavery, and yet this demand for absolute cheapness, irrespective of all other considerations, might connive at obtaining goods by slave labour. (Cheers.) That was an anomaly, and it was high time to protest against such a condition of things. (Hear.) By permitting foreign sugars, subsidised by bounties, to come into the British markets the people of this country would perhaps get them one farthing a pound cheaper at first, but not afterwards, because the foreigners would soon have a monopoly, and then they could charge almost any price they had a mind to, or, owing to their inferiority, were obliged to. Again, if those who were engaged in the industry in this kingdom could not find work, they would have to be supported out of the rates. And judging from the large number of persons engaged in the sugar industry their maintenance would cost about 2d. extra in the pound—not of sugar—(laughter) but money sterling. (Hear, hear.) To allow this to be, would, to use a trite but pertinent expression, be a "penny wise and pound foolish" policy indeed. It had been suggested that if the work in this country was not sufficient to support the labourer he should emigrate. Well, he should like to know who would emigrate, and how that would place England in a better position? It would be the skilful, the enterprising, and the industrious men who would leave. These

men could not be expected to have much love for the country from which they were in a manner expelled, but they devoted themselves, on the other hand, to the one which received them with open arms, and gave them the means of providing in plenty for their exiled and starving children. (Hear, hear.) They would then raise up such a competition with us—in comparison to which that of the Americans is but a gentle breeze compared to a tornado. (Hear.) These were the views of the working classes of the kingdom, and because the League supported these views the various trades which he had the honour to represent would lend their aid to make the movement a speedy success. (Cheers.)

The motion was then put and carried unanimously.

The following Articles of Constitution having been distributed in print for perusal, the same were taken as read :—

ARTICLES OF CONSTITUTION.

Membership of League.

1. The National Anti-Bounty League is an association of persons and organised Bodies in all ranks of trade, commerce, and industry, notifying to the Executive Council of the League their agreement with the object of the League, and their willingness—as far as may be in their power—to support the action of the Executive Council in promoting that object, and contributing a yearly subscription of One Shilling or upwards to the funds of the League.

Object of League.

2. The object of the League is the restoration of Free-trade on our National markets to those competitors to whom it is, or shall be, denied by the system of Foreign State Bounties. The League will, therefore, promote the abolition of all Foreign State Bounties, or their neutralisation by such countervailing duties as, being incident upon and payable out of the bounties, shall, within the territorial limits of our own State, deprive the subjects of the States granting bounties of all advantage therefrom over and in competition with, or to the disadvantage of, the subjects of our own and other States granting no bounties. The League will not advocate any fiscal measures tending to raise prices or rates of freight above *natural prices* or *natural rates of freight*, or having any *exclusive operation* in favour of our *national industries and trade*, or intercepting any *natural advantages* possessed by the subjects of other States, or having any operation on the adjustment of prices or rates of freight, other or more extended than the absence or abolition of Foreign State Bounties would have.

Powers of Executive Council of League.

3. The operations of the League shall be conducted by an Executive Council, with full discretionary powers of direction, control, and management in respect of the affairs, funds, officers, property, and terms of subscription to the funds of the League, and with power to add to or diminish the number of the Members and regulate the proceedings of such Council; but, having regard to the object as the League, its operations shall be free and clear of party character.

Dissolution of League or Executive Council.

4. The Executive Council shall have power to dissolve itself by resignation to a General Meeting of the League, and the League shall be dissolved by a vote of two-thirds of the Members present at a General Meeting.

General Meetings of League.

5. General Meetings of the League shall be convened by and at the discretion of the Executive Council, for such purposes as the Council may determine.

Reports and Accounts of League.

6. No Member of the League shall be entitled to any report of the operations of the Executive Council, or statement of cash account, except in such form, and at such times, as the Executive Council, having regard to the successful work of the League, may deem expedient.

Mr. CULWICK moved:—"That the scheme of a National Anti-Bounty League, prepared in pursuance of the directions given at the previous Conference by a provisional committee, having been read, the same is approved and adopted as the articles of constitution of the League." He maintained that both capital and labour were equally interested in putting a speedy termination to all bounties which operated injuriously on British markets. It was now piteous to see the magnificent piles of buildings, containing every modern improvement for the manufacture of sugar, closed, and the hands who found employment in them obliged to stand idle. Thousands of men were out of employment in the east end of London, and millions of capital sunk, and all owing to the British Government being afraid to put a stop to foreign bounties. (Hear, hear.) If foreign bounties were countervailed or in some other way put an end to, it would be the means of rendering justice to all, and giving labour to those who needed it. (Hear, hear.)

Mr. QUINTIN Hogg seconded the motion, and said he felt little difficulty in speaking there as to what all present thought a gross injustice, not only to men in England, but also to those in the West Indies and other places where capital was locked up and labourers were thrown out of employ; what they should endeavour to do was to educate public opinion outside on this all-important question of foreign bounties. Speaking more particularly of the West Indies, they should all remember that it would be a great injustice if England allowed her emancipated slaves to lapse into the slavery of ignorance and vice, as they certainly would do, if foreign bounties were allowed to continue their baneful influence in British markets. Those bounties, if continued, would drive out of the West Indies the white man, who now exerted a civilizing influence on their coloured fellow citizens. (Hear, hear.) He agreed with Mr. Shipton, that the arguments of their opponents, if carried to their logical conclusion, would deprive them of the very benefits which had been attained by free trade. There was no doubt in his mind that the proposed National Anti-Bounty League would prove not only of great value to the nation at large, but be a means of bringing about a bond of union between capital and labour. (Cheers.) The organization of the League would enable any threatened trade or industry to obtain information as to the best means of averting the impending danger. Recently articles had appeared in the French press upon the bounty question, and to get hold of these, to disseminate them, and to let the people see in England that the principles they were that day advocating were not only held to be sound here but in other countries, would be an important work, and would come legitimately into the scope of the League. Another point the League would have to take up was the duty of explaining that a countervailing duty was merely an Insurance—that it would be better now to pay a farthing a pound more than to pay a penny hereafter. It was not at any time pleasant to be taxed, even by one's own Government, but it was infinitely worse to have taxes levied upon us by foreigners. At the present time, France, Austria, and some other countries were doing it, by compelling free trade

producers to give bounties out of their own pockets. The Government of Great Britain should protect us from such taxes. (Hear, hear). The League would also be a bond of union amongst various trade organizations throughout the country. Anyone who liked might join the League, but it would not be a place in which he could air his own particular crotchets. He was sure that the West India Committee were willing to do all they possibly could to carry into effect the objects he had sketched. He was of opinion also, that as the Shipping interest was so severely threatened, they might expect to have active co-operation from engineers, shipwrights, and others engaged in the ship building trade of Great Britain. (Cheers.) This renewed activity on the part of foreign States would not be an unmixed evil if it compelled our Government to take up the question it had shirked so long, and if it brought home to the people of this country the necessity of prompt action if they wished to retain our commercial and maritime supremacy. (Cheers.)

Mr. T. M. KELLY supported the resolution. He said the time had now passed for merely crying out against the bounty system, for the period had arrived when they should demand from the Government, in no uncertain terms, a measure to lessen, if not entirely obliterate, the evils under which all classes are suffering in this country from uncountervailed foreign bounties. During the last three years the agitation against foreign bounties had been actively carried on, and many facts in connection with them had been brought prominently before the public, and the result was an universal condemnation of the bounty system. (Cheers.). The committee appointed by the House of Commons to inquire into the foreign bounty system had reported in favour of the scheme suggested by the National Anti-Bounty League. That fact should be pressed home upon the Government, and no stone should be left unturned until the Legislature carried the recommendations of that committee into effect. Some persons imagine that the working-men of this country would take no interest in so great an economical question as was involved in the settlement of bounties. People generally took an interest in anything which

hit them hard, and there could be no doubt that the bounties of foreign States had hit the working-men of England in such a manner as to cripple thousands of their number. (Cheers.) Not only the workmen of this country took an interest in the question, but the whole of the people by whom they were backed up felt an all-absorbing interest in it. If they were wrong it was the duty of the Government to tell them so, but they had not, neither had the Cobden Club, nor John Bright. (Hear.) They might imagine that they would defeat the ends of justice by a masterly policy of inaction, but if they thought so they reckoned without their host. The fact was they did not care whether or no the sugar industry or any other industry of this country was prosperous or declining so long as they could retain office without interference. Those who were in power concentrated all their efforts upon keeping those who were out from getting in, and those who were out devoted themselves entirely to turn those who were in out, and obtain office for themselves. Public opinion must be brought to bear upon the question, and for that purpose meetings should be held throughout the country. By that means the Government would be forced to do something, notwithstanding that there were many opponents to the anti-bounty movement in State departments. None could forget the cruel proposition of Mr. Robert Giffen, of the Board of Trade. A wrong form of the favoured nation clause had been allowed in some of our treaties with foreign countries, notably in the case of Austria, a country which was giving heavier bounties than any other. (Loud cheers.) It was then with the greatest pleasure he saw a League being formed for the purpose of breaking, once and for ever, the backbone of foreign bounties. He might say that he had attended two hundred public meetings on the question, and at all of them bounties were unequivocally condemned. Mr. Childers had admitted to him that it did not matter to him whether the levying of a countervailing duty would interfere with free trade or no, so long as it would be the means of doing that which was required by a vast number of Her Majesty's subjects. It ought long ago to have been put into operation. It was quite certain, however, that its introduction would in no way

be antagonistic to free trade. (Loud cheers.) That was the opinion of the whole of the trades throughout the country. The French Government had simply been using the people of this country for their own ends. They had told them that they, the French Government, were anxious to abolish the bounties, and that it was Austria who stood in the way; facts, however, proved quite differently. She has now extended the bounty system by giving them on moist refined sugar, by a new law which comes into operation on 1st of October next. She has also provided by a Mercantile Marine Bill to award state bounties on all ships officered and manned by Frenchmen trading over sea, and to and from her ports. Such a line of conduct was highly impolitic on the part of the French Republic, when it was considered that the Government now existing in that country obtained such an enormous amount of moral support from the working classes of Great Britain. (Loud cheers.)

The resolution was then put and carried unanimously.

Mr. QUINTON, Secretary of the Coppersmiths, moved: "That this meeting do now resolve itself into a general meeting of the League.

LIEUT.-COL. COWAN seconded the motion, and in doing so said that there were one or two matters which had been touched upon that had not he thought been completed. He would, therefore, take that opportunity of saying a few words to the meeting on the questions to which he had alluded. (Hear, hear.) It seemed to him that some of the speakers, especially Mr. Kelly, were a little too hard on the French. We should not blame the French people or their Government for doing all they possibly could to make France a great and wealthy nation. We should take a lesson from them and use our best endeavours to make England as prosperous as we could. To do that, there could be no question as to the mode. What he would advise would be to watch foreign aggression and endeavour to meet it and stop it, no matter in what form it appeared, or from what quarter it came. (Cheers.) They had had to watch in former times the aggressive policy pursued by a foreign Government with respect to many matters in this country.

The people of England, however, put their foot down upon all aggressive policy and stamped it out. They would now, no doubt, follow the same course with respect to the bounty system and, ere long, cause to be given up by our neighbours across the water. (Cheers.) There was another point to which he wished to call attention. Some persons had talked a great deal about the immorality of putting on a countervailing duty. He should like to be told, however, in what way it was immoral. (Hear, hear.) With regard to that point he would not then deal any further, as the whole question would soon be discussed at public meetings throughout the length and breadth of the land. Every Government, for the last eighteen years, had affirmed the principle which the League now wanted to carry into effect. The Convention of 1864 provides, in clause 19, that a countervailing duty should be levied on the article sugar in the event of other nations granting bounties. All that was now required was for the Government to show that they had the interest of the people at heart, by carrying into effect the policy which they had striven to uphold for the last twenty years. (Cheers.) The bounties had been the means of ruining not only thousands of working men but also very many large capitalists. If anyone doubted what he said, let them walk through the east of London and judge for themselves. There they would see enormous buildings of great architectural importance and filled with machinery of the most costly description for refining purposes. Those buildings, which were once hives of thriving industry, are now silent and falling in some cases into ruin. With regard to shipping they were told that, owing to the new French law, which would soon come into operation, the Union Jack would be made to disappear from off the seas, and that the tricolour would take its place. Surely they were not going to stand idly and allow this. They must put their ideas into a practical shape, and impress upon the people that unless they rouse themselves and be determined to put a stop to these insidious attacks upon our commerce and trade, no matter from what quarter they come, that before long one industry after another will be taken from us. (Cheers.) They were told by a great political economist that

all men were born with wants which must be supplied in one way or another, either by industry or stealing. So with nations. As a matter of fact France wanted commerce to make it great, and as she could not produce it legitimately she was trying to steal it. (Hear, hear.) She might do that perhaps with impunity with a nation weaker than herself, but with a nation like England she certainly could not. Speaking as an Englishman he hoped we should never yield up our supremacy on the seas or on British markets—a supremacy purchased in the past by the blood and treasure of our country-men. (Cheers.)

Mr. GILLMAN, secretary of the Cooper's Society, supported the resolution, which was unanimously adopted.

Sir GEORGE CHAMBERS, explained that he had to leave the meeting on other urgent private affairs, and as the League was now inaugurated, he would vacate the chair, which was then taken by Mr. Nevile Lubbock.

A cordial vote of thanks was then accorded to Sir George Chambers for the able manner in which he had presided over the Conference.

The following resolution was then proposed :—“ That this first general meeting of the National Anti-Bounty League, pursuant to the 3rd Article of the Articles of Constitution of the League, doth nominate, constitute, and appoint as the Executive Council of the League the following persons :—Thomas Daniel Hill, Esq., Chairman of the West India Committee; Lieut.-Colonel Cowan; Nevile Lubbock, Esq., merchant; Wallwyn Poyer B. Shepheard, Esq., M.A., Barrister-at-Law; H. W. Challis, Esq., M.A., Barrister-at-Law; Forster M. Alleyne, Esq., M.A., Barrister-at-Law; Quintin Hogg, Esq.; George Martineau, Esq.; James Duncan, Esq.; Mr. John Monteith, London Coopers' Association; Mr. C. H. Quinton, General Secretary of the London Copper-smiths; Mr. Samuel Peters, General Secretary of the Sugar Operatives Association; Mr. George Shipton, Secretary of the London Trades Council; Mr. William Jack, Representative of the Workmen engaged in the East and West India Docks; Mr. St. Leger Gillman, Secretary of the Hand-in-Hand Society of Coopers;

and Mr. T. M. Kelly, Secretary to the Dock Labourers and Warehousemen."

The resolution was carried unanimously, and the general meeting of the League terminated.

The members of the Executive Council appointed three of its members—viz., Lieut.-Colonel Cowan, James Duncan, Esq., and Neville Lubbock, Esq., Honorary Treasurers, and Forster M. Alleyne, Esq., H. W. Challis, Esq., and Wallwyn P. B. Shepheard, Esq., Honorary Secretaries of the League.

ON THE MANUFACTURE OF SUGAR FROM THE SUGAR CANE.

By R. H. HARLAND, F.C.S.

The art of manufacturing and refining sugar has now attained to the rank of the second industry in the world. The two sources from which the supply of sugar is derived are the beetroot and sugar cane—the one growing in Europe, the other requiring the heat of a tropical climate to bring it to maturity. Many other plants also have the property of producing crystallizable sugar, identical in chemical composition with that prepared from the beet or cane; notably the sugar maple (*Acer. saccharum*), from which a large quantity of sugar is manufactured in Canada, the United States, and Borneo, but the supply is now gradually falling off on account of the destruction of the maple forests.

The sugar obtained by the natives of Bengal and Siam from the various species of palm is, on account of the crude way in which it is manufactured, of very inferior quality, and is mainly consumed in the countries where it is grown. The juice of the Nipah palm (*Nipa fruticans*) is almost equal in saccharine richness to that extracted from the cane, with the advantage that it is much cleaner, and contains no colouring matter or chlorophyll—the vegetable matter being easily precipitated—giving a liquor as clear as spring water. This species of palm flourishes near the sea, or on the edges of brackish pools, and takes up a large quantity of

salt, which makes its appearance in the juice in varying quantities,—sufficient, in some cases, to give the liquor a decidedly saline taste. Were it not for this drawback, I have no doubt that a large quantity of excellent sugar would be obtained from this source.

Since the time when the beetroot was first experimentally cultivated for sugar, it has, by careful cultivation become the source of nearly half the total quantity of sugar which is produced at the present day. It is not, however, entirely due to the agriculturalist that beetroot sugar is able to compete so successfully with cane, but a great deal of the success attending its production is due to the fact that the manufacturer called in the assistance of chemistry and chemists, to enable him to decide on the most scientific and profitable method of working; and although the average quantity of crystallizable sugar contained in the beetroot juice is only half that which is contained in the juice of the sugar cane, and other impurities are likewise present which have to be removed previous to the evaporation of the liquor to form the best crystals, yet the quality of the product is superior to and commands a much higher price than the raw cane sugars which are imported to this country from the colonies, and which require to be refined previous to consumption. Of course, Demerara sugars, and also sugars from other countries where the vacuum pan is in use, compete favourably with the refined article, either on account of their peculiar colour or some other distinguishing mark which renders them pleasing to the eye, and even, perhaps, from the fact of their containing a proportion of uncrystallizable sugar (molasses), they are more palatable to the public, who, for some purposes, prefer the impure article to the pure loaf sugar.

The reason for the difference in quality between the colonial cane sugar and continental beet sugars is easily found when we take into consideration the difference in the mode of manufacture, and also the fact that the extraction of sugar from the beet has been investigated scientifically by some of the leading continental chemists, and chemistry and proper chemical supervision rule all the operations from the manuring of the root to the time when the sugar is turned out of the factory in an almost chemically pure

condition. That this is so, is proved by the fact that almost every chemical journal issued contains the results of some research or enquiry into one or other of the important operations connected with its manufacture or the products produced therefrom ; and, further, every manufacturer knows so well the great importance of chemical analysis, that hardly one beetroot sugar factory is without a chemist. Now, in the case of the sugar cane planter : he begins by manuring his land with some compound which is very likely to be quite unsuitable for the variety of cane which he wishes to grow ; perhaps he does not consider it necessary to trash his canes or clean them so as to allow the rays of the sun to exert their action on the cane, and assist in producing the saccharine matter ; but leaves them to grow as best they may until the time comes for cutting and extracting the sugar ; in many cases the boiling-house is unable to keep pace with the cutting, from bad weather or other causes, and a stock of canes are standing at the mill, and perhaps remain exposed to the atmosphere for some days, but this is not of so much importance, as I shall afterwards show (except in the case of canes that have been grown on land that is poor in lime salts : in this instance the juice is generally very acid, and rapidly undergoes fermentation even before it is expressed from the canes), as a practice which I have frequently seen followed of leaving a portion of the juice to stand all night, or cleaning and evaporating the juice to a density of 18° to 20° B., and allowing it to stand—say for 8 to 12 hours—to settle, thus causing fermentation to set up, and consequent loss of crystallizable sugar and formation of molasses ; in fact, in many boiling-houses the operations are conducted entirely by rule of thumb, and the overseer in charge knows little or nothing about the composition or properties of the substance which he is manufacturing.

Of course these remarks do not apply with the same force to estates which work with the triple-effect and vacuum pan, but even in many of these cases mistakes are made, and losses of sugar occur which would be prevented and remedied if a system of analysis were carried out. Occasionally, syrups are allowed to stand too long a time before re-boiling, under the supposition that

on account of the density they will keep any length of time, but in hot climates the temperature is so favourable to fermentation, that in syrups of a density of 38° to 40° B. crystallizable sugar is converted into glucose, although the appearance of the surface of the liquor would not seem to indicate that any chemical change was taking place; indeed, it is not even necessary that the sugar should be in the form of syrup to allow of this change taking place, for low sugars will form molasses and drain rapidly when heaped in bulk or stowed in a ship's hold, owing to rapid conversion of crystallized sugar into glucose by the action of fermentation. This is a well known fact, and the loss of weight in cargoes of raw sugar is constantly being determined; but the actual loss of crystallizable sugar caused by drainage and deterioration, and formation of probably not less than from 2 to 4 per cent. more glucose in the raw sugar than it contained when shipped, is a fact that, up to the present time, has been lost sight of. In one instance, where a dry sugar, containing 88 per cent. crystallizable sugar, 3 per cent. uncrystallizable, and .92 ash, was stored for six months in a warehouse in Manila: at the end of that time the bags were quite wet and sticky, and molasses was draining away in considerable quantities; the sugar then showed a loss of 6 per cent. in crystallized sugar, and formation of nearly 5 per cent. of glucose, besides being very acid to litmus paper. A sample of Taal sugar, kept in a well-stoppered bottle in the laboratory for one year, showed a decrease of 1½ per cent. in the crystallizable sugar, and a corresponding increase in the amount of glucose. Another very common mistake in sugar houses abroad consists in sending molasses to the distillery before the whole of the sugar has been obtained; these molasses should be re-boiled to a jelly, and allowed to crystallize slowly in tanks, by which means a further supply of sugar is obtained which would otherwise have been converted into alcohol.

It will be seen from what has already been said, and it is also a well-known fact, that a great waste of sugar goes on in the process of open-air boiling, and many mechanical contrivances have been invented in order to obtain the sugar in a solid form, at as low a

temperature as possible; the best of these, and the one which is now adopted in all countries that send to England and elsewhere sugar suitable for direct consumption, is the vacuum pan; but in many sugar-producing countries the vacuum pan has not been adopted, either from want of capital, or from a conservative tendency on the part of the planter, who prefers to go on spoiling his sugar by open-air boiling to adopting machinery which would in a very short time pay for itself in the quality and increased price of the article produced.

In the colony of Queensland, which in point of time is one of the youngest of the sugar-producing countries but which has gone far ahead of older settlements, a high-class vacuum pan sugar is produced polarizing 97 to 98 per cent., from juice of which the following analyses are specimens:—

CANE JUICE EXPRESSED FROM CANES GROWN IN THE MARY DISTRICT,
QUEENSLAND, AUSTRALIA.

	Gingham Cane.	China Cane.	Mixed Samples from various species of Cane.
Beaumé at 15·5° C	11·5°	....	10·5°
Crystallizable Sugar ..	19·50%	....	16·40%
Glucose.....	.25	....	.41
Ash (Soluble Salts)....	.70	....	1·11
Other organic matters.	1·17	....	2·51
Total solid matter...	21·62	....	20·43
			22·26

These juices all yield very good sugar, giving on the average of one season's work 1·25lbs. of sugar per gallon of juice at 10° B., of which 65 to 70 per cent. is nearly white crystals, and compares very favourably with colonial refined sugar; the remaining quantity is sugar of a lower grade, and obtains a ready sale as "pieces." This result is obtained without the use of bone-black, and the only method of purification adopted is the plan of precipitating the vegetable "feculences" with milk of lime, and removing them by skimming as they rise to the surface of the liquor when heat is applied.

The manner in which these juices behaved in the boiling-house was very different, great difficulty being experienced in the treat-

ment of the China cane juice, the sugar produced being worse in quality and deficient in quantity when reduced to the standard of 10° B. as compared with the juice from the Gingham cane which was easily converted into sugar of excellent quality; the reason of this is apparent from the analyses, the China cane containing a larger quantity of ash or soluble salts which have the property of converting crystallizable sugar into glucose during the operation of boiling. It is curious to note the difference in quality between these two samples of juice, especially as the two species of cane were grown on one plantation under similar conditions, it is evident that the China cane has the property of abstracting from the soil a larger proportion of mineral salts, and these salts, when soluble, go greatly towards explaining low yield of sugar and large quantity of molasses; these analyses show the necessity of studying the composition of the juice from the various species of cane so as to determine the most suitable class of cane to grow, and also the kind and proportion of manure to employ so as not to increase more than is absolutely necessary the quantity of those salts which are so detrimental in the process of manufacture to the quality and quantity of the sugar produced.

The Philippine Islands export large quantities of raw sugar. The production is said to amount to nearly 200,000 tons per annum, but none of the sugar exported is of good quality, as the following analyses of dry sugars will show:—

	Yloilo Sugars.			Zambales Imitation
	No. I.	No. II.	No. III.	Yloilo.
Crystallizable Sugar	85·30 ..	81·60 ..	78·60 ..	82·10 ..
Glucose.....	5·80 ..	8·30 ..	9·10 ..	7·70 ..
Ash	·94 ..	1·02 ..	1·90 ..	2·00 ..
Moisture	5·06 ..	6·06 ..	5·56 ..	4·20 ..
Unknown organic matter.	2·90 ..	3·02 ..	4·84 ..	4·00 ..
	100·00	100·00	100·00	100·00

	Pampanga			
Cebu Sugar,	Cebu Sugar,	(new Sugar),	Laguna	Taal.
superior.	current.	unclayed.	Sugar.	Sugar.
Crystallizable Sugar.	81·20 ..	71·00 ..	78·40 ..	82·70 ..
Glucose	7·80 ..	10·90 ..	10·50 ..	5·70 ..
Ash	2·15 ..	2·56 ..	1·80 ..	1·34 ..

The Zambales sugar is the same number by Dutch Standard as No. 1 Yloilo. The proportion in which these sugars are produced is $\frac{1}{2}$ of No. 1, to $\frac{2}{3}$ of No. 2, to $\frac{5}{8}$ of No. 3. The insoluble organic matter in these sugars is generally less than 2 per cent., and is of a very slimy nature; the remaining soluble unknown organic matter is the amount which it is necessary for the bone-black to absorb. Of course all these sugars are produced by a similar arrangement to the copper-wall, and in some districts the destruction of sugar by burning in the process of evaporation, is exceedingly large. The cane juice expressed from the ripe canes is of fair quality, and will compare favourably with the Queensland samples. A sample from the Taal district, which is extremely fertile and well suited for sugar plantations, showed to analysis :—

Crystallizable Sugar	18·30
Glucose	·10
Ash	·30
Other organic matter	3·25

	21·95

With a vacuum pan and proper machinery a juice of this quality should yield excellent grocery sugar. It would hardly be of such good colour as the Queensland sugar on account of the large proportion of green colouring matter (chlorophyll), a portion of which was not precipitated by neutralization with milk of lime, but the sugar would compare very favourably with crystallized Demerara. At the present time the quality of the sugar produced from this juice corresponds to the analysis of Taal sugar given above, the article being fit for nothing but brewing black beer.

In one district in Luzon, where the cane grows luxuriantly, often to a height of twelve feet, and one stool produces four or five canes, the crushing season lasts considerably longer than in other districts, and the sugar produced is of superior quality. The soil being extremely fertile, a sample was analysed, and showed the following results on the dried sample :—

CANE SOIL FROM CAMARINE SIN, LUZON.

	Per cent.
Silicious matter	53·39
Alumina	13·16
Oxide of Iron	4·80
Oxide of Manganese	·10
Oxide of Magnesia	·42
Potash and Soda, as Chlorides	1·14
Carbonate of Lime	1·60
Sulphuric Acid	·09
Phosphoric Acid	·25
Carbonic Acid	Traces.
Organic and Volatile Matters	25·05
	<hr/> 100·00
Moisture in Sample before drying	6·79

Unripe canes invariably contain a large quantity of glucose, which is probably converted in the process of ripening into crystallizable sugar.

The following analyses are of canes known to be in an unripe condition and juice from them:—

UNRIPE CANES.

	Per cent.
Crystallizable Sugar	10·00
Glucose	2·80
Ash	·74
Soluble Ash	·32
Woody Fibre	12·26
Water	74·20
	<hr/> 100·00

JUICE FROM UNRIPE CANES.

	Per cent.	Per cent.	Per cent.
Crystallizable Sugar	8·60	7·76	7·24
Glucose	3·10	2·30	2·50
Ash	·21	·25	·34
Unknown Organic Matter	1·27	1·74	2·89
Total Solid Matter	<hr/> 13·18	<hr/> 12·05	<hr/> 12·97

In order to ascertain whether the juice of the cane underwent any decomposition when the canes were kept for some time pre-

vious to crushing, the following experiments on unripe canes were made. These canes were selected, as it was thought probable that they would deteriorate more rapidly on account of their acidity, and the fact of their containing less saccharine matter.

Two plants were selected, each having two healthy canes growing from the one stool; the juice from one of these was expressed and analysed immediately, the other was put aside in the laboratory for eight days, at the expiration of which time the juice was expressed, and submitted to analysis.

FIRST EXPERIMENT.

Weight of Cane	1lb. 10 $\frac{1}{4}$ oz.	....	2lbs. 8 $\frac{1}{4}$ oz.
Loss of Weight in 8 days ....	..	....	4·75oz.
Equals per cent. ....	..	....	11·8 per cent.
Beaumé of Juice	5 $\frac{1}{2}$°	....	5 $\frac{1}{4}$ °
Crystallizable Sugar.....	5·99 per cent.	....	7·33 per cent.
Glucose	1·70	„	1·50 „
Ash	·30	„	·32 „
Unknown Organic Matter	2·27	„	1·99 „
Total Solid Matter	10·26	....	11·14
Reaction	Slightly acid.	....	Slightly acid.

SECOND EXPERIMENT.

Weight of Cane	2lbs. 1 $\frac{1}{4}$ oz.	....	2lbs. 6 $\frac{1}{4}$ oz.
Loss of Weight in 8 days ....	..	....	4·7oz.
Equals.....	..	....	12 per cent.
Beaumé	5 $\frac{1}{2}$°	....	5 $\frac{1}{2}$ °
Crystallizable Sugar.....	8·17 per cent.	....	6·54 per cent.
Glucose	1·90	„	1·40 „
Ash	·26	„	·24 „
Unknown Organic Matter	·87	„	2·34 „
	11·20	....	10·52
Reaction	Slightly acid.	....	Slightly acid.

These results show that no fermentation of the juice had taken place during the time the canes had been exposed after cutting ; in fact, the singular result of the glucose being less in the exposed samples, would seem to indicate that a ripening action had been going on ; these results must be taken for what they are worth, but they would certainly seem to indicate that canes could be

kept and transported long distances without undergoing loss of crystallizable sugar; but this, of course, only applies to sound canes, and the result might be quite different in cases where the rind of the cane was cracked or eaten into by rats.—From *The Analyst* for October.

D E M E R A R A .

THE VALUE OF LAST YEAR'S EXPORTS.

Georgetown, 14th September, 1880.

Sir,—We desire to submit for the information of His Excellency the Governor, two Statements, A and B, showing the actual net proceeds obtained for the crops of forty-nine sugar estates during the year 1879; and the valuation of the total exports for the year, if taken on the average of the results obtained.

The estates from which the returns have been obtained include some of the finest properties in the colony.

The returns were obtained with the object of testing the correctness of the estimated value of the exports as submitted to His Excellency the Governor by several of the Elective Members of the Combined Court, under date of the 22nd June last, and it includes sugar shipped to England on owners' account as well as sugar sold for export to the United States, or for local consumption.

From the Statement A, it will be seen that the actual net proceeds of over 51,000 hogsheads of sugar have been obtained and that the average value has proved to be:—

Per hhd. of Vacuum Pan Sugar	\$90 42
Per hhd. of Molasses do	\$59 56
Per hhd. of Muscovado do	\$60 35
Per pun. of Rum	\$34 48
Per pun. of Molasses	\$17 80

From the Statement B, it will be seen that if the above figures are taken as a basis of calculation, the total value of colonial products exported in 1879 is \$10,506,016 44, while the valuation submitted by the Elective Members of the Court was \$10,890,013 80.

The difference between the two valuations mainly arises from the various modes adopted of calculating the proportion of small packages to the hogshead of sugar.

The calculations now made are based on the figures adopted by the Controller of Customs.

The subject of the over-valuation of exports was brought to the notice of His Excellency the Lieutenant Governor, in the reply by the Elective Members to his speech made on the opening of the Combined Court in 1879.

The Elective Members of the last Combined Court were surprised to find that the exports were again over-valued, and greatly regret that the pressure of other business prevented His Excellency the Governor bringing forward the subject until the close of the session, when there was no opportunity of expressing their opinions on the question.

We think that the value of goods imported and re-exported should be stated separately from the value of the exported products of the colony.

The *Mercantile Intelligencer*, published by the Colonist Office, has been examined, and the prices quoted appear to be fairly accurate—the advance in the value of sugar did not take place until the middle of October.

We respectfully suggest that, in future, the Directors of the Royal Agricultural Society might be requested to furnish an annual estimate of the value of the staple exports.

We desire to state that it is our intention to forward a copy of this letter and the annexed Statements to the local papers for publication.

We have the honour to be, Sir,

Your obedient Servants,

(Signed) D. C. CAMERON, F.R.

T. H. GLENNIE, F.R.

WILLIAM CRAIGEN, F.R.

W. F. BRIDGES, F.R.

EDWARD STEPHENS, F.R.

MEWBURN GARNETT, F.R.

The Honorable C. P. AUSTIN, Acting Government Secretary.

STATEMENT A.

Actual Nett Proceeds of the Crops from 49 Sugar Estates, for the year 1879.

VACUUM PAN SUGAR:

33,269 hhds. ... 2186 trcs. ... 13,877 brls. ... 58,204 bags. ... 40 $\frac{1}{2}$ trcs.

Equal to 43,749 hhds. ... \$3,955,975 65 .. Average per hhd., \$90 42.

MOLASSES SUGAR:

799 hhds. ... 604 trcs. ... 2005 brls.

Equal to 1452 hhds. ... \$86,476 68 .. Average per hhd., \$59 56.

MUSCOVADO SUGAR:

5225 hhds. ... 272 trcs. ... 3382 brls.

Equal to 5829 hhds. ... \$351,773 58 .. Average per hhd., \$60 35.

RUM:

16,287 puncheons .. \$561,590 96 .. Average per puncheon, \$34 48.

MOLASSES :

4447 puncheons .. \$79,184 92 .. Average per puncheon, \$17 80.

STATEMENT B.

British Guiana Exports for the year 1879.

Vacuum Pan Sugar....	88,000 hhds.. at \$90 42....	\$7,956,960 0
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Molasses , , ,	3,642 , , 59 56....	216,917 52
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Muscovado , , ,	14,000 , , 60 35....	844,900 0
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Rum	30,429 puns., , 34 48....	1,049,191 92
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Molasses	15,694 , , 17 80....	279,353 20
----------------	----------------------	------------

	\$10,347,322 64
--	-----------------

Other Products	158,693 80
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	\$10,506,016 44
--	-----------------

The valuation as made by the Elective Members ..	10,890,013 80
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Showing an excess in the valuation of	\$383,997 36
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Correspondence.

THE BONNEFIN FILTERS.

To THE EDITOR OF "THE SUGAR CANE."

DEAR SIR,

In your October issue appears what professes to be an answer, from an independent point of view, by M. Vassard, to my letter in the previous issue.

M. Vassard says he makes his assertions from personal observation, but I venture to think his observational power must be very limited, or at least that he has employed it very superficially.

Your correspondent very kindly, and I have no doubt to the best

of his ability, proceeds to give me a lesson on the action of a capillary filter, and, by way of impressing that lesson on my memory, gives two examples of the action of capillarity.

The first example shows plainly to me that as a teacher of science he is a complete failure, and for his own good I would simply ask him calmly to read it over again, use well what little observational power he has, and I have no doubt he will, in time, come to see how thoroughly he has got mixed up.

The second example reads against himself, and entirely condemns his answer (7), where he states,—“It will surprise Mr. Remmers to hear that there is no necessity of lixiviating the cakes, as no juice remains behind.” It certainly did surprise me, and I think I can hear M. Bonnefin exclaiming, on reading M. Vassard’s letter, “Save me from my friends,” as I am certain M. Bonnefin knows better than attempt to make any manufacturer swallow *that* assertion.

Supposing the fluid portion of the slush he recommends me to put on my coat contains sugar in solution, and suppose I have a sufficient quantity to make experiments on, with any of the existing forms of filter presses (Bonnefin’s excluded), or with the ordinary bag filters, I will find that after I can pass no more liquor through the press or bag, on opening the press a series of cakes, sludgy matter, or the faces of the cloths covered with a gummy substance, and the rest of the chamber filled with liquor. If, for instance, I take the cakes I will find they still contain an amount of sugar, and in the case of bags I will also find a large quantity of sugar in the sludge. Up to the present time manufacturers know of no other commercial mode of extracting the contained sugar from the cakes or sludge than washing out with steam or water, and thus producing weak liquor, which is a source of annoyance to all manufacturers.

M. Vassard surely thinks the observational powers of manufacturers are on a par with his own. Does M. Vassard really think if manufacturers could get a machine, filtering as perfectly as he asserts, at such a speed (I am supposing the liquor stands at 29° to 30° Beaumé), and so thoroughly extracting the liquor that no necessity remains for washing, that they would not all adopt it?

Nay more, I assert that if such could be done, and if only one manufacturer adopted it, the others would be forced to follow to protect their own interests.

I shall now deal with M. Vassard's replies to my queries.

(1.) It should trouble him if Bonnefin's filters are not in actual use, because if they are not, he by his advocacy of the system may lead manufacturers to waste a deal of money in useless attempts at its adoption. M. Vassard will perhaps pardon me for presuming to tell him, that either fortunately or unfortunately some things, that are based on a perfectly sound theory, do not work when reduced to practice, also that some things working on a small scale will not work on a large, and again, some things working on a large will not work on a small.

(2.) He states that the quantity filtered per hour is equal to twelve times the capacity of the filter. This has no bearing on the question at all, unless he states at what density, and it might have occurred to him that there will of necessity be a great difference in the amount of filtered liquor obtained either from a Bonnefin or any other form of filtering machine if the density is 1° or 30° Beaumé.

(3.) He says the filtration in Bonnefin's system is a continuous flow of pure juice. This is his reply to my query asking the time of each filtration, and yet he completely condemns himself in a foot-note, where he says the cloth is changed from time to time when it is covered with gummy matters. Exactly so; and this is just what I wanted to know: How many revolutions does the hour hand of a watch make to complete his "from time to time?" or does it make a revolution at all before the cloths require changing? This, I presume, also requires time. What is its duration during the operation? The gum formed on the cloths, as also the cloths themselves, contains, according to M. Vassard, *no sugar*, as he states that of necessity the liquor extracted from a capillary filter contains the *whole* juice of the cane.

(4.) The answer to this query is a curiosity in its way, and I freely admit I can make nothing of it. In a foot-note to it, however, he states that "Mr. Remmers appears to have entered the arena against Bonnefin's filter in complete darkness as far as the

modus operandi is concerned." Is not that the very reason I penned the queries in order to eliminate that darkness by comparing the results obtained with other filters? But it appears from M. Vassard's attempted explanations that comparisons are odious; nay, probably odorous.

(5.) Again, I ask, what was the specific gravity of the liquor from which the calculations of amount of filtered liquor per hour were made, and how of necessity does it constitute the whole of the saccharine juice of the cane?

(6 and 7.) Are merely assertions of an utter impossibility, and clearly show to any unbiassed mind that M. Vassard has attempted to answer questions, the subjects of which he is in total ignorance of.

(8.) M. Vassard says there is no necessity for making analysis of liquor before and after filtration, but here I again beg to differ from him, because if the filtration of sugar juice by Bonnefin's filter is effected so rapidly and all putrescible matters entirely eliminated, the amount of crystalizable sugar obtained must be greater than by any of the other so-called slow and imperfect modes of filtration.

In conclusion, and in opposition to the axiom laid down by M. Vassard, I have always found that manufacturers—a few isolated cases excepted—were only too anxious to try any likely mode of cheapening the cost of their productions, and in this country I know of no class of manufacturers who are more alive to the introduction of improvements than sugar refiners. If M. Bonnefin's mode of introducing his presses to the notice of sugar refiners is the same as M. Vassard's finish to his letter—viz., by implying a want of intelligence on the part of refiners, if they do not adopt capillary filters, I am sure he will meet with little success.

I would rather M. Bonnefin had replied to my letter himself, as I would thereby have got at the fountain head of the system. If M. Bonnefin reads this, I will be glad if he will favour me with the statistics I asked for in my previous communication, when I may have something further to say to *him*.

I am, yours truly,

B. H. REMMERS.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

3891. ALEXANDER SCOTT, jun., JOSEPH DUNCAN SCOTT, and THOMAS ROBERTSON OGILVIE, all of Greenock, in the county of Renfrew, North Britain. *Improvements in treating and shaping sugar, and in apparatus therefor.*

4240. THOMAS BROADBENT, of Huddersfield; in the county of York. Engineer. *Improvements in hydro-extractors or centrifugal machines, and in the method of supporting the same.*

ABRIDGMENTS.

742. JOHN GARRETT TONGUE, of 34, Southampton Buildings, Chancery Lane, Middlesex. *Improved means and apparatus for cleansing the discharge water from sugar manufactories and other industrial establishments.* (A communication from William Knauer, of Osmünde, near Grobers, Prussia.) The discharge waters on which foam or froth will form are caused to fall first on to a wheel with buckets, which form more or less froth, and throw it off into a suitable channel which carries it away, and the water, freed from the foam, falls into a vessel provided with sieves, which arrest any solid matters in suspension therein. This water is then pumped up into a reservoir. Waters which contain muddy, slimy, or other impurities are passed through different purifying tanks, and led into a reservoir, from whence they are pumped into the above-mentioned reservoir, or first sent through the former apparatus. From this reservoir, the purified water flows into a heating apparatus, and from thence into a mixing tank, where lime is mixed with it. The water then flows into settling tanks, in one of which chlorate of manganese is added. Precipitates are by this means formed, and collected from time to time. The water being heated to about 167° Fahrenheit, all organic matters are destroyed and rendered incapable of fermentation. The purified water is then caused to flow back through the heating apparatus (in order to aid in heating the water which is passing to the purifying tanks), and into a reservoir, from whence it is pumped into a gradation tank, similar to those used in salt works.

815. WILLIAM MORGAN BROWN, of Southampton Buildings, London. *Improvements in apparatus for moulding sugar.* (A communication from Charles H. Hersey, Francis C. Hersey, and Dudley Pray, all of Boston, Massachusetts, U.S.A.) This invention was described in May, among the American Patents, No. 225601.

861. WILLIAM SPENCE, of 8, Quality Court, Chancery Lane, Middlesex. *Improvements in the method of refining saccharine vegetable juice, Muscovy sugar,*

and syrups. (A communication from Anton Gawalowski, of Trebitsch, Moravia, Austria, and Franz Teichmann, of Wagstadt, Silesia, Austria.) The object of this invention is to dispense with the usual filtration of spodium in refining saccharine juices, &c. In the case of pure vegetable juice (beet-root or cane juice), the process takes place at the separation or saturation thereof. The juice is first properly heated and then is added, either at once or after the addition of lime, from 0·2 to 0·5 per cent. of phosphite of alumina (upon ten tons of beet root). This phosphite of alumina, or a solution of phosphate of alumina in phosphoric acid, is a new agent. Another agent employed is a residual powder obtained in the production of red or yellow prussiate of potash. This powder or raw spodium dust is freed from all potash compounds, and stirred with raw muriate or nitric acid, and left to settle. The pulp thus formed is diluted with water and lixiviated. This spodium dust may be revivified after use by lixiviating and boiling, with etching lye of soda treated with muriatic acid and dried, or it may be heated in air-tight retorts and cooled down, if its decolouring powder has been lost. The juice, after complete saturation, is now separated from the pulp by a press or filter, and after refining is brought to the boiler for condensation. In the case of raw sugar or syrups, they are dissolved in or diluted with pure water in boilers, and brought to the required consistency. To this heated solution, from one quarter to two and a half per cent. of lime is added. The clear after well mixing with the milk of lime (which is preferably specially prepared) is heated and skimmed, and about 0·2 to 0·5 per cent. of phosphite of alumina and residual powder or spodium dust. In refining molasses or little sub-product syrups, they are put into a boiler and mixed with phosphite of alumina, as in the first case, and the mixture is saturated and pressed through filters. The carbonic acid gas used for saturation is taken from a generator, similar to those used in aerating waters, instead of using the carbonic acid produced during the working process.

BELGIAN.

51543. L. POSKIN, of Hanret, Eghezée. *A weed hook for cleansing beetroot.*
51555. H. A. J. MANOURY. *Economical sugar works for farms.*

FRENCH.

134634. VERLIN. *Purifying and decolouring sugar-juice and syrups by sulphuration.*

134461. HERBST. *A double machine for slicing beetroot.*

CERTIFICATES OF ADDITION.

130000. ERNST. *Manufacturing manure from the residues of molasses.*
130299. CHARLES and PERRET. *A continuous diffusion apparatus for extracting the sugar from beetroots.*
14601. LAMBERT. *Manufacturing sugar by means of compressed air.*

GERMAN.

10640. L. PAULUS and P. GUÉROULT, of Paris. *A filter-press with an hydraulic after-press.*
10650. E. BARTELS, of Bautzen. *A continuous filter-press with or without lixiviation.*
10875. E. A. BARBET, of Anzin (France). *An apparatus for washing or reviving animal charcoal.*
10936. SELWIG and LANGE, of Brunswick. *A lixiviator for filter-presses.*

AMERICAN.

231756. JESSE BROCKWAY, of Oswego, Illinois. *Evaporator.* This invention consists in constructing an evaporating pan with its bottom inclined from both sides towards the centre, and providing it with a longitudinal partition from end to end along the line of its greatest depth; and subdividing the two chambers into smaller chambers of varying size by means of partitions and movable gates. The furnace is provided with dampers corresponding with the areas of the above chambers, in order to protect the syrup in the said chambers from scorching.

231804. HENRY C. HUMPHREY, of New York, Assignor to Franz O. Matthiessen, of Irvington, N.Y., and William A. Wiechers, of New York City. *Process of economically obtaining starch and glucose from corn.* This process is briefly as follows:—Having soaked and pressed the corn, the resultant mass is washed with water, and then strained, thus separating a portion of the starchy matter of the corn, which is manufactured into starch in the ordinary manner. The residuum is mixed with water acidulated with oxalic or other strong acid; and the mixture is then boiled for about two hours until conversion into glucose, or, if desired, until conversion into sugar. If the converted product be sugar, the liquid (after separation, neutralization, defecation, filtration through bone-black, and final evaporation) is allowed to harden and concrete into proper packages.

232200. ENOS P. MILES, of Clay Centre, Kansas. *Evaporator.* This invention consists of a furnace in the form of a segment of a circle. The pan is made in three segments, two of which may be over the furnace, and the third is held by a revolving frame, upon which are also held the other two segments or pans, ready to be brought over the furnace, when one of the former ones is taken off to cool, by the revolving of the frame. The flues of the furnace are also made to divide the heating space into two parts, one of which communicates direct with the fire chamber, and the other is shut off from the same by an adjustable damper. Both flues communicate with a chimney. By these means, a gradually decreasing heat may be supplied to the pans, suitable to the successive stages in converting the juice into syrup. A catch pivotted on to the central pivot of the revolving frame holds the two

pans, which are above the flues in their proper positions. More than three pans and two flues may be used when necessary, according to the size of the furnace.

232995. H. A. J. MANOURY, of Paris, France. *Process and apparatus for preparing saccharate of lime and obtaining sugar.* These improvements relate to the preparation of the granular tribasic saccharate of lime from molasses. The molasses to be treated is evaporated to from 38° to 42° Beaumé, and from 5 to 10 per cent. of carbonate of soda is added to it in the pan to precipitate the salts of lime; the molasses thus prepared is then cooled before further treatment. The lime has then to be prepared. The anhydrous lime coming from the furnace is plunged in water and afterwards placed in heaps, when it falls into powder under the action of the heat and water. The molasses and lime are then fed in suitable proportions, separately, into a triturating apparatus, where they form a combination, which hardens instantly. This triturating apparatus consists of a horizontal cylinder or chamber provided with internal inwardly projecting curved blades. A shaft is mounted within this cylinder and provided with curved beaters, which are so placed as to pass between the fixed blades. When this shaft is set in motion it granulates the hardened saccharate of lime. The saccharate in this granular state is then purified by means of diluted alcohol, and the sugar is extracted therefrom by filtration and evaporation.

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To Oct. 16TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS.		IMPORTS.		DELIVERIES.		
	1880.	1879.	1880.	1879.	1880.	1879.	
London ..	77	..	75	..	249	..	270
Liverpool ..	27	..	46	..	173	..	220
Bristol ..	1	..	8	..	42	..	47
Clyde	35	..	50	..	197	..	222
Total ..	140	..	174	..	661	..	759
Decrease..	34	..	Decrease..	98	Decrease..	..	14

STOCKS OF SUGAR IN THE CHIEF MARKETS OF THE WORLD ON THE
1ST SEPTEMBER, FOR THREE YEARS, IN THOUSANDS OF
TONS, TO THE NEAREST THOUSAND.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other empires.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
185	58	17	5	2	267	326	262

CONSUMPTION OF SUGAR IN EUROPE FOR THREE YEARS, ENDING
1ST SEPTEMBER, IN THOUSANDS OF TONS.

Great Britain.	France.	Holland	Germany (Zollverein)	Five other empires.	TOTAL 1880.	TOTAL 1879.	TOTAL 1878.
935	307	28	284	210	1764	1815	1707

ESTIMATED CROP OF BEET ROOT SUGAR ON THE CONTINENT OF EUROPE,
FOR THE ENSUING SEASON, COMPARED WITH THAT OF THE THREE
PREVIOUS SEASONS.

(From *Licht's Monthly Circular*.)

	1880-81.	1879-80.	1878-79.	1877-78.
	Tons.	Tons.	Tons.	Tons.
France	425,000 ..	277,912 ..	432,636 ..	398,132
Germany (Zollverein)	500,000 ..	411,625 ..	420,684 ..	383,828
Austro-Hungary	410,000 ..	406,375 ..	405,907 ..	330,792
Russia and Poland ..	225,000 ..	225,000 ..	215,000 ..	220,000
Belgium	80,000 ..	58,017 ..	69,926 ..	63,075
Holland and other Countries.....	30,000 ..	25,000 ..	30,000 ..	25,000
Total.....	1,670,000	1,403,929	1,574,153	1,420,827

STATE AND PROSPECTS OF THE SUGAR MARKET.

The sugar market opened last month with a decline in value consequent on the expectation of a large beetroot crop; prices afterwards recovered, but finally closed about 3d. to 6d. lower for most kinds of raw sugar, and 6d. to 9d. lower for French loaves.

The imports in 1880, as compared with those of 1879 show a decrease of about 98,000 tons against 97,000 last month.

The deliveries for the year show a decrease as compared with those of 1879 of about 14,700 tons. Two months ago they showed an increase over the deliveries of 1879 of 2,400 tons.

The stocks of sugar, which on the 18th September were 38,300 tons less than on the same date in 1879, were, on the 23rd October, about 33,200 tons less than at the same period in 1879.

The reticence of buyers during the last month or two, in view of the uncertainty of the amount of the beetroot crop, will have a tendency to counteract the effect on prices of the yield of beetroot sugar this year over last, and deficient stocks in Europe, as compared with last year, will assist in doing this; otherwise we fear the tendency of statistics is rather in favour of lower than higher prices for some time to come.

Present quotations of the standard qualities are as under:—
Porto-Rico fair to good refining, 21s. to 21s. 6d., against 21s. 6d. to 22s.; good to fine grocery, 22s. 6d. to 24s. 6d., against 22s. 6d. to 25s.; Martinique crystals, 25s. 6d. to 26s., against 25s. 6d. to 26s. 6d.; No. 12 Havana, 23s. to 23s. 6d., against 24s. to 24s. 6d.; Cuba centrifugals, 96 % polarization, 24s. to 24s. 6d., against 23s. 6d. to 24s.; fair to good refining Cuba Muscovados, 21s. 6d. to 22s., against 21s. 6d. to 22s.; middling to good brown Bahia, 18s. to 19s., against 18s. to 18s. 6d.; good to fine Pernambuco, 19s. to 19s. 6d., against 18s. 6d. to 19s.; Paris loaves, 28s. 6d. to 29s. 6d., against 29s. 3d. to 30s.

THE SUGAR CANE.

No. 137.

DECEMBER 1, 1880.

VOL. XII.

~~NOTE~~ The writers alone are responsible for their statements.

For Table of Contents, see opposite the last page of each Number.

THE EXPORT BOUNTY QUESTION.

In continuation of the letters recently addressed by the Sugar Refiners' Committee to the Board of Trade, copies of which appeared in our last issue, we now give copies of some letters from the West India Committee to the Government. Both Committees make out a strong case for immediate action in this matter, and it is difficult to understand why there should be so much delay, more than three months having already elapsed since the Select Committee reported. For two years the Government have been able to postpone the question on the ground that the whole subject was in the hands of a Parliamentary Committee, and that no further action could be taken until that Committee had reported. If there be any excuse for the present delay it can only be that Ministers have been enjoying the repose of the long vacation. The President of the Board of Trade has been overpowered with the official exertions of a yachting excursion among the lighthouses, and the personal anxieties of intermittent speechifying at Birmingham. Thus it is that the real and practical details of official work are made to give way to the absurdities of official play, or to the necessities of individual and party interests. On one point, indeed, the Government have made a declaration, which we may take for what it is worth, but which does not appear to be worth much if judged by the ordinary standards of logic or common sense. In reply to an ill-judged letter from a committee of working men, the Board of Trade has announced that the whole subject of the sugar

bounties, with the report of the Committee, is receiving the careful consideration of the Government, and that a communication will be made as soon as a decision is arrived at; but that the objections to countervailing duties are so great that the Government are not prepared to entertain their consideration. In reference to this letter we give, in another part of our issue, an extract from a leading article in the *North British Daily Mail*, because we think it important to take every opportunity of circulating the independent utterances of any paper holding so leading a position in the Liberal press of the country. The writer points out, in clear and incisive language, the inconsistency involved in this statement. The objections to countervailing duties are fully dealt with in the report of the Select Committee, and therefore, as the Government have not completed their careful consideration of that report, it is difficult to understand how they can yet know whether the objections to countervailing duties be good or bad. In fact, this letter shows that the Government have now done exactly what writers in the press, Members of Parliament, and Government officials have been doing throughout the controversy—forming off-hand opinions without due consideration. This is quite inexcusable, more especially as the sugar trade have been constantly assured that the report of the Select Committee was looked for with interest and would be considered with care.

In connection with this part of the subject a curious report got abroad just before the appearance of the Board of Trade letter, to the effect that a difference of opinion on this question existed in the Cabinet. We have reason to believe that there was some foundation for this, and the rumour eventually took tangible shape in a bitter little article in the *Daily Telegraph*. We have frequently called attention to the extraordinary conduct of a portion of the press on this question, and this little article appears to be the culminating point in a concerted line of action adopted by a small knot of writers who have, for some good reason best known to themselves, carried on by every means which mis-statement and mis-representation could devise, a long, bitter, and most unfair attack on the sugar industries of this country. This attack is,

we think, to be explained by the fact that certain writers in the press, and certain advisers of the Government, took up at the outset—probably hastily and without due consideration—a position on this question which proved, on full investigation, to be quite untenable. Persons in this dilemma are often apt to substitute abuse and misrepresentation for argument and fact. This article in the *Daily Telegraph* is a fine specimen of wild writing. “There is the strongest reason to believe,” it says, “that a very influential and active section of the Cabinet is prepared to tamper with the basis of free trade, and coquette with projects dear to partial interests, and favour plans of fighting hostile tariffs by means of countervailing duties. The reactionary element in the Cabinet is prepared to legislate to augment the price of a necessary of life. To put the matter in plain terms, they are ready to tax the whole body of consumers for the benefit of a special trade.” All this is merely a repetition of what has been thoroughly disposed of a thousand times. But it goes down with the general reader, and probably answers the purpose of those who wrote it. There is something very charming in the cool contradiction contained in the next sentence. “If such a course would not be, strictly speaking, the protection of a native industry, it would be the grant of a subsidy to the refiners out of the pockets of the entire community of Great Britain.” If this would not be, strictly speaking, protection to a native industry, we wonder what the writer would consider to come under that definition. He concludes as follows: “The real mystery is that Lord Bateman and Mr. M’Iver should have made converts in a Cabinet which meets under the presidency of Mr. Gladstone, and includes Mr. John Bright, the champion of a free breakfast table. The danger of a reactionary step is considerable, and the vast body of consumers, to whom cheap sugar is a great boon, should endeavour to avert the contemplated blow.” Certainly there is nothing so effective as strong language; and the introduction of two such names as Lord Bateman and Mr. M’Iver is more powerful than any argument, however far removed the sphere of these gentlemen may be from the discussion of the sugar question. This kind of writing has been going on, week after week,

in spite of the fact that the policy attacked has been long since proved—and declared by one of the best political economists of the day—to be not only consistent with free trade, but absolutely conceived in the interests of free trade. The same authority wrote, only the other day, “ We can—at least so all our Revenue Departments concur in saying—effectually prevent the disturbing effect of bounty-fed imports on our markets by a countervailing duty. That countervailing duty would have this effect and no other—that all the sugar subject to it would still come in, which would have come in, if there had been no bounty, and no more; and this is just what the theory of free trade requires.” If the *Daily Telegraph* be rightly informed, it is satisfactory to know that a very influential and active section of the Cabinet is actuated by such sound views as these, and most assuredly Mr. Bright, the champion of a free breakfast table, ought to be one of this section, seeing that the existence of bounties has twice in the course of the last four years caused a rise of fifty per cent. in the price of sugar.

Mr. RITCHIE, the member for the Tower Hamlets, made a good speech at the dinner given to him by the working men, at which an address was presented signed by more than ten thousand representatives of trade societies, thanking him for the work he had so ably accomplished in connection with the sugar question. In reference to the report of the Select Committee, Mr. Ritchie gave some interesting information as to the divisions upon it. He showed that the recommendation which, as the *Spectator* expressively puts it, proposes, in renewing our commercial treaties, to provide against any construction of the favoured-nation clause so harsh that it shall compel us to deal unequally with different nations, under the name of dealing equally with all, was supported by a majority of nine to four; also that the whole report was supported by a majority which included three members of the Liberal party. As to the minority report, he pointed out how illogical and inconsistent it was in recommending the abolition of bounties, and yet refusing to recommend that anything should be done to lead to that abolition. Mr. Ritchie was struck with the remarkable success attained by the agitation in the face of such persistent

hostility in the press. He objected to the reference of the question to the Board of Trade, because Mr. Giffen, one of the leading officials in that department, had come before the Committee not only to give statistical evidence, but also as a theorist to state why, in his opinion, a countervailing duty would be contrary to free trade principles. To refer the question to the Board of Trade under these circumstances was, in Mr. Ritchie's opinion, a thing that ought not to have been done. He explained that the Committee did not ask the Government to put on a countervailing duty, but simply to reopen the negotiations. He believed that if the Government went into this matter, with the intention of rectifying it, the thing would be done, and though it might adopt the principle of a countervailing duty, that duty would never have to be brought into operation. In his remarks on the Board of Trade Mr. Ritchie said, in a joking way, that it appeared to be a department which attended to everything except matters connected with the general trade of the country. This seems to have given offence to Mr. Chamberlain, who, in one of his many recent speeches at Birmingham, entered into an elaborate defence of his department in reply to Mr. Ritchie, and wound up his remarks with the following words:—"It is not likely, and I hope it is impossible, that a department which has such a past to appeal to will ever be false to its history and its traditions. That, perhaps, accounts for the prejudice which Mr. Ritchie entertains towards us, for he may well think that it is very unlikely that we shall ever be induced, even by the most specious reasoning, to return to protection, though it comes to us in the guise of reciprocity or countervailing duties." Mr. Chamberlain ought to know perfectly well that this is a misrepresentation of Mr. Ritchie's views and of the facts. He wished his hearers to go away with the impression that Mr. Ritchie was an advocate of "protection," and that, therefore, he was hostile to the Board of Trade. He also desired that his audience should confuse "reciprocity" with countervailing duties. Probably he succeeded, but we cannot believe that he himself suffers from any such confusion of ideas.

The meeting of working men at Hull, in continuation of the

public meetings held in the preceding month, was successful in a remarkable way, because resolutions were carried in opposition to the opinions expressed by the members for the borough, Mr. Norwood and Mr. Wilson. As we give an account of this meeting elsewhere we need only point to what Mr. Ritchie said about it in the speech to which we have already referred. The tenor of Mr. Norwood's speech, he remarked, was the benefit of the bounty to the working classes, by enabling them to get their sugar cheaper, but at the end Mr. Norwood said, speaking of the bounty, "The real point is to see how we can get rid of it." Mr. Wilson's argument tended, in Mr. Ritchie's opinion, in favour of the views of the Select Committee. Mr. Wilson said we could not compete with America as she had such great natural advantages. This, Mr. Ritchie pointed out, was exactly what the Committee urged; they wished that England should be left in the same position as they allowed America to be in, to profit by her own natural advantages. They asked that what had been secured for other countries should be secured also for ourselves.

At the Colston Anniversary, at Bristol, Mr. ~~MONTELEY~~ spoke out bravely and distinctly on the sugar question. The granting of bounties by a foreign Government on any manufacture was an outrage on free trade, and the Government of this country was bound to do its utmost to get rid of the bounty. If no other measure would secure a remedy for that which was an utter subversion of free trade principles, he should, without the least hesitation, support the imposition of a countervailing duty. He had looked at the question most carefully. The same view was held by some of the first men in England—men as attached to free trade as himself. These are good sound utterances, such as we have heard on former occasions from other members of the Liberal party—Mr. Duncan McLaren, Dr. Cameron, Mr. J. Stewart, Mr. Arthur Cohen, Q.C., and others. It would be well for the cause of truth and justice, and might lead perhaps to some slight diminution in the amount of political clap-trap and dishonesty which at present unfortunately prevails, if a few more members would say what they believe to be true, and not what they think will most easily please their hearers.

MR. NORWOOD, M.P., ON THE SUGAR QUESTION.

An important meeting of the Hull Chamber of Commerce took place on the 28th of October, and in the evening of the same day a large gathering in the Royal Institution of that town discussed and passed various resolutions in reference to foreign export bounties. Mr. Norwood, the member for the borough, was present and spoke at some length on both occasions. The sugar question did not come up for discussion at the Chamber of Commerce, but Mr. Norwood referred to the meeting which was to be held in the evening, and said, "If I may venture to express an opinion, I do hope that gentlemen who take an interest in the very large question of free trade and protection may find themselves able to attend that meeting at eight o'clock." At the evening meeting Mr. Norwood, and his colleague, Mr. C. H. Wilson, M.P., spoke in opposition to the resolutions, but did not succeed in carrying the meeting with them; in fact their arguments were somewhat roughly handled. At the conclusion of the meeting, Mr. Norwood apologised for his defeat by explaining "that several free trade friends had suggested to him that they should go there and have a division, but he advised them otherwise, as that was merely a meeting of friends to discuss the question." In both of these remarks Mr. Norwood seems to assume that free traders must necessarily be hostile to the abolition of export bounties.

When we turn to his speech, however, we find him at the outset declaring exactly the contrary. "He objected as thoroughly as anyone could do to these bounties." The system of bounties "was an offence on the part of these countries against the principle of free trade." He considered the cheapening of sugar by export bounties "very doubtful political economy." In dwelling on the advantage of artificially cheapened sugar, Mr. Norwood pointed out that it was not only the bounty-fed sugar which was thus cheapened, but that the importation of bounty-fed sugar was affecting the price of every other sugar, and that "the advantage to the working classes was infinitely greater in other cases than in the particular sugar named." This fact, which Mr. Norwood regards as a conclusive argument in favour of export bounties, is

in reality the great and fatal argument against them. It is just because other sugars, receiving no bounty, have been forced, by bounty-fed competition, below cost price that consumers have of late years become dependent on the bounty-fed sources of supply, and have periodically to pay an advance of fifty per cent. when these sources prove temporarily deficient.

In stating his objections to a countervailing duty, Mr. Norwood gave valuable information as to the opinion of the Law Officers of the Crown. The Foreign Office refused to allow that opinion to appear as evidence before the Select Committee, but it was understood that, in the opinion of those authorities, the terms in which the most favoured nation clause is worded altogether precluded the imposition of a countervailing duty. Mr. Norwood's statement, which comes with authority from a member of the Select Committee, alters very importantly the complexion of this opinion. He says the Select Committee "were advised by the Law Officers of the Crown that they would be breaking the treaties with other nations if they did not *levy to a nicety* upon each country he had named the precise countervailing duty which should be equivalent to the bounty they gave." If this be correct, the most favoured nation clause permits the imposition of countervailing duties; and it is manifest that if in every case the duty were below the bounty no infringement of the clause could ensue which is not now involved in the imposition of no duty.

Mr. Norwood then proceeded to fall into the usual fallacy, from which we must presume that he has not yet read the report of his own committee. "If they once launched upon the stormy sea of protection and reciprocity and retaliatory duties, they must do it all round." This is Mr. Norwood's view of the case, and yet he says that if he were "to go into the blessings of free trade, he should be insulting their intelligence." He did give a glance at the blessings of protection, when he said that "they must protect all round, and if they were clever enough to devise a scheme which would lay the burdens or benefits equally upon all classes, he dared say the result, in the long run, would not be very unsatisfactory." Being free traders, we cannot say that we agree with Mr. Norwood in this assertion, which appears to us to be a blank

denial of every axiom of free trade. As to the countervailing of a bounty involving us in a voyage on the stormy sea of protection, reciprocity, and retaliation, we need not repeat what has been so often said in proof of an almost self-evident proposition, that the one is exactly the contrary of the others, and that every argument in favour of countervailing a bounty is conclusive in its condemnation of protection, reciprocity, and retaliation.

The pithy opening speech of the Chairman, Dr. Rollit, completely answered this oft-repeated fallacy, but had no effect in preventing its immediate reproduction by Mr. Norwood, and its hearty endorsement by his colleague, Mr. Wilson, who gravely assured his audience that Mr. Norwood's argument was practically unanswerable. "He thought it was so plain to all, except those who were personally interested, that it was scarcely worth while arguing." And yet Dr. Rollit—not personally interested—had disposed of the idea in a few well-chosen words at the commencement of the meeting. A duty to countervail a bounty was, he explained, "in no sense protection, which meant artificial dearness, and excluded even fair competition; nor reciprocity, which might develope into retaliation; but a mere restoration of natural equality by neutralising the advantage of the bounty." The coupling of a countervailing duty with protection, reciprocity, and retaliation, must be a most fascinating and seductive fallacy to some minds, when we find two Members of Parliament clinging to it and holding it up as "practically unanswerable" immediately after so clear and simple a refutation. Mr. Wilson went further, actually maintaining that a duty to countervail a bounty given in hard cash out of the revenue of a foreign State would justify our farmers in demanding a duty upon wheat, to countervail what he graphically and correctly described as "the bounty of nature in America." It is evident that the political brain is not more free from occasional fits of crooked perversity than that which the ordinary mortal is pleased to call his mind. Does Mr. Wilson include the editors of the *Spectator*, the *Saturday Review*, and the *Statist*, or Mr. Cohen, Q.C., Dr. Cameron, and Mr. Duncan M'Laren, or the author of the Oxford Cobden prize Essay, and the editor of the

North British Daily Mail among "those personally interested," who, in his opinion, are the only deluded persons in this matter? All these authorities, differing *in toto* from Mr. Norwood and Mr. Wilson, consider a duty to countervail a bounty to be a restoration instead of an infringement of free trade. If they are right, it is difficult to understand how such a measure could justify a demand for other measures of a totally contrary character. That some minds cannot distinguish between two policies diametrically opposed to each other—the one sound and good, the other unsound and bad—can be no reason for refusing to adopt that which is good. There must be other causes for this persistent misrepresentation and misunderstanding of the question. In the first place, to deal properly with the subject would involve trouble, and the first principle of Government is to avoid trouble as long as possible. Members of Parliament and of the Press, with certain honourable exceptions, are doing their best, consciously or not, in helping the Government to rid itself of a troublesome question. In the second place, it is often easier to catch the popular fancy with meaningless commonplaces about "Protection," "the food of the people," and other such useful phrases, than by pointing out the truth. Here again the majority of writers and speakers prefer the broad and easy way. It is clear that "the sugar question" forms at present no exception to these general rules. There is, however, one important point connected with it which may eventually make it a remarkable exception, and may, perhaps, before long, rouse these surface politicians from their present state of complacent satisfaction with "practically unanswerable" arguments. The sugar question has been taken up by the working classes in a manner so earnest and intelligent that arguments will have to be a good deal sounder than Mr. Norwood's or Mr. Wilson's if they are to stand the test of a public meeting. We suspect that the hon. members for Hull began to think so before the meeting was over. It is not often that resolutions are carried at public meetings in direct opposition to the views expressed by all the Members of Parliament present. Mr. Norwood publicly asked his friends to come and support him. Perhaps it was just as well that he afterwards privately asked them to stop away.

ACQUIESCENCE BY GREAT BRITAIN IN FOREIGN
BOUNTIES OPPOSED TO THE FREE TRADE
OF RICHARD COBDEN.

Some persons persist in asserting—without ever venturing to give their reasons—that it is more consistent with free trade to acquiesce in the foreign bounty system, and its protective restrictions upon our home and colonial sugar industries, than to adopt efficacious measures for preventing this aggressive protection from violating free trade, and disturbing the natural conditions of commerce and industry in this country. We recommend such persons to study free trade from the speeches of Richard Cobden. We quote a few passages from these speeches as replies to certain queries of our own :—

What is free trade?—"A free and unfettered intercourse established between all the countries of the earth, as was clearly the design of nature."—Aug. 25, 1841.

Should there be any exception?—"What we want is a free trade in everything."—Aug. 25, 1841.

Ought State bounties to be allowed to disturb the natural conditions of trade and industry?—"There is an unnatural cause for this unnatural state of things, and that unnatural cause is the law which interferes with the Wisdom of the Divine Providence, and substitutes the law of wicked men for the law of nature."—Sept. 28, 1843.

Upon whom lies the blame for the decline of the National Sugar Industry and the establishment of a Continental Sugar Monopoly?—"The fault lies with those who support monopoly, who are deaf to reason and justice, and who place themselves upon a pedestal of injustice,—a pedestal which is always liable to fall and always certain to bring down those who stand upon it."—Sept. 28, 1843.

What are the rights of Labour?—"Now, gentlemen, I think if anybody in the country can say he is the advocate of the right of property, I am the man. Why, my whole labour in public for the last five years has been to restore the rights of property to those unjustly deprived of them. Adam Smith says: 'The property which every man has in his own labour, as it is the original foundation of all other property, so it is the most sacred and inviolable. The patrimony of a poor man lies in the strength and dexterity of

his hands, and to hinder him from employing this strength and dexterity in what manner he thinks proper without injury to his neighbour, is a plain violation of the most sacred property.'”—Oct. 13, 1843.

Are not bounties, as tending to monopolies, injurious to working men?—“Now, having thus the countenance of Adam Smith for ‘the assertion, I must say I think that . . . those who support ‘the corn laws and other monopolies violate the right of property ‘of the labouring man.”—Oct. 13, 1843.

Is not the essence of free trade a perfect freedom in the adjustment of natural prices?—“We require corn at the natural price ‘of the world’s market.”—July 3, 1844.

If free trade makes an article dearer, ought we to resist free trade?—“Whether corn becomes dearer with a free trade—as ‘wool seems to be getting up now, after the abolition of the 1d. a ‘pound—or whether it is cheaper, it matters not to us, provided ‘the people of this country have it at its natural price, and every ‘source of supply is freely opened, as nature and nature’s God ‘intended it to be.”—July 3, 1844.

THE OBJECTS AND CONSEQUENCES OF FOREIGN BOUNTIES ON GOODS AND SHIPPING.

Foreign bounties are intended to encourage foreign industries, and open up artificial channels for the employment of foreign capital and labour; the effect of their acceptance by this country is to lower British wages and restrict the employment of British capital.

A bounty is a protection, and creates a monopoly. It is consequently opposed to free trade. It is in the end more injurious to the countries accepting it than to the countries giving it.

A bounty on shipping and freights is tantamount to a bounty upon all articles carried in ships so treated.

The acceptance of bounties must ruin home industry and pauperise our working-men.

A SUGAR CONFERENCE.

The following is a series of letters addressed by the West India Committee to Her Majesty's Government, urging that an International Conference should be called together as soon as possible, on the basis suggested by the Report of the Select Committee. These letters have been referred by the Foreign Office to the Governments whom they respectively concern. It will be seen that Sir C. Dilke's visit to Paris was observed; and the result of the letter relating to it was, that his communications with the French Government, on a Commercial Treaty, included a reference to the settlement of the sugar bounty question:—

West India Committee,
9, Billiter Square, E.C.,
30th September, 1880.

THE RIGHT HON. THE EARL GRANVILLE, K.G., &c., &c.

My Lord,

I have the honour to acknowledge the receipt of Mr. Lister's letter of the 9th September, stating, by your Lordship's direction, that the representations of the West India Committee on the question of the Foreign Sugar Bounties were under the consideration of Her Majesty's Government, and that the question of the recommendations made by the Select Committee on the Sugar Industries were receiving attention.

I am to express the great anxiety of the British colonial sugar trade that Her Majesty's Government would be pleased to take steps, as soon as possible, to secure an International Conference of the Powers interested in this question, in accordance with the recommendations of the Select Committee, so that the question may take a definite form and be ripe for the action of Parliament next Session. I am, therefore, humbly to pray that your Lordship would consent to address a Circular Despatch to Her Majesty's representatives abroad, with the view of a Conference being called at the earliest opportunity.

In the meantime, I venture to call your Lordship's attention to the opinions recently expressed by the *Deutsche Zuckerindustrie*, the principal organ of the sugar industry in Germany. These opinions show the feeling which exists in Germany on this subject, and are also important as proving that the German sugar interests are anxious that a Conference should be called to settle the question.

The *Deutsche Zuckerindustrie* of August 20th, 1880, after commenting upon the Report of the Select Committee, and replying to certain articles in the *Times*, in which that report is attacked, thus states its definition of free trade:—"To leave production as well "as trade in their natural conditions, by which means every "country, in the interest and to the advantage of itself as well as "others, will develop that article, and turn its attention to that "industry for which it is best fitted, by its soil, climate, distribu- "tion of population, &c. Nothing, however, is more contradictory "to this principle than bringing articles, through direct or indirect "contributions of the State, into the markets of other countries, "where they compete artificially with the productions which have "been developed under natural conditions." The article proceeds to show the difference between a protective duty and an export bounty:—"The latter being an attack on the industries of other "countries, which, if only kept up high enough and long enough, "it may destroy." In a second article, published on August 27th, the effect of the bounties in the largely increased importations of refined sugar, since 1863, into the United Kingdom, and the consequent decline of the British sugar refining industry, is explained, as well as the want of increase in the production of the British colonies. The assertions that a countervailing duty would raise prices, and cause the people of Great Britain an extra expense of 2½ to 3 millions sterling per annum for their sugar, are conclusively replied to. "These assertions lack proof. The English "market is of such extraordinary importance to the sugar trade, "especially to those European countries which produce beet sugar " (Russia excepted), that none of these countries will allow new "difficulties to interfere with their trade. Supposing that no

" steps were taken for the abolition of bounties, and that the " countervailing duty could become a certainty, this fear alone we " think would be sufficient to ensure the abolition of those " bounties. Even now the sugar manufacturers and refiners of " France, Belgium, and Holland, are ready to come to an agree- " ment with England about the withdrawal of bounties, provided " that the latter consents to raise countervailing duties against " those countries not parties to the understanding." The article implies that Germany would also join, for " the German beetroot " sugar trade would be the very one to reap the greatest benefits " from the abolition of the bounty system;" and, from recent debates in the Austrian Legislature, it is not likely that Austria would keep out of such a Conference. The article concludes:— " The English Government has for twenty years been making " efforts to do away with sugar bounties. Endless negotiations " have taken place, and every Ministry, whether Liberal or Con- " servative, has given its serious consideration to this matter. " Now that the end in view can be so easily attained by firmness, " people shrink from the consequences which exist only in their " imagination."

The same paper in its third article on September 3rd, expresses its opinion " that no rise in the prices of sugar would result from " an International Conference for the abolition of bounties, if this " Conference should bring about a countervailing duty on the " bountied sugars of those countries which do not take part in it; " for either no nation will keep aloof from the Conference or at " most only one or two, whose more difficult communication with " the English market is all the less likely to cause a rise in prices, " because their sugar will seek an outlet through other markets. " * * * It is in the general interest of the trade to call " together an International Conference in order that the develop- " ment of this industry may follow the natural laws of every other " production, and not, as heretofore, be raised to an exaggerated " importance by artificial means such as bounties." The article proceeds to make some suggestions as to the best time for calling the Conference together, and concludes—" We hope that the

"proceedings of the House of Commons about the Report of the Committee may end by the Government being empowered to open communications with other sugar-producing countries, with the object of calling together an International Conference for the abolition of bounties, the date to be left to the discretion of the Government, but in any case it should be within the year."

I am to submit that the above views are eminently worthy of the attention of your Lordship, and humbly to express a hope that Her Majesty's Government may be induced, by knowing the manner in which the proposal of a Conference would be received by the sugar industry of Germany, to take steps to secure the meeting of such Conference at the earliest possible date.

I beg permission, in conclusion, further to impress upon your Lordship the fact that similar views to those brought forward by the organ of the German sugar industry are likewise entertained by the sugar industries of Great Britain, France, Holland, and Belgium. And it is not to be overlooked that these views are in entire accordance with the recommendations in the Report of the Select Committee of the House of Commons. The Austrian Legislature, too, have passed resolutions to the same effect, although the sugar industry of that country, which continues to derive enormous advantages from the bounties obtained from the public revenue of that State, have not yet given their adhesion to the proposed common arrangement. In short, everything shows that matters are fully ripe for the action of Her Majesty's Government, which, in the matter of a Conference, will meet, as far as can now be seen, with the approval and support of the great majority of the industries concerned.

I have, &c.,

(Signed), THOS. DANIEL HILL,

Chairman.

West India Committee,

9, Billiter Square,

London, E.C.,

11th October, 1880.

THE RIGHT HON. THE EARL GRANVILLE, K.G., &c., &c.

My Lord,

I have the honour to acknowledge the receipt of Sir Charles Dilke's letter, written by your Lordship's direction, dated 4th instant, stating that the letter of the West India Committee, dated the 30th September, praying that steps might be taken to secure an International Conference, in accordance with the recommendations of the Select Committee of the House of Commons on Sugar Industries, had been referred to the Board of Trade.

In reply, I am desired to say, that the West India Committee are in communication with the Board of Trade, with the view of affording information as to the serious extension of the bounty system in France, Holland, and Austria.

The Committee observe, however, from statements in the newspapers, that Sir Charles Dilke is proceeding to Paris on matters relating to a new Commercial Treaty. I am humbly to remind your Lordship that it has been understood that the abolition of bounties on the export of sugar would form an important element in any commercial negotiations with the French Government; and I am to pray that your Lordship will be pleased to authorize Sir Charles Dilke to come to an understanding with the French Government as to the proposed Conference on the sugar question. And, in view of the arrangements proposed to be made for a new Commercial Treaty, I venture further to direct your Lordship's special attention to the following recommendation of the Select Committee:—"That should the commercial treaties, to which this country is a party, prevent Her Majesty's Government from taking part in an International Conference which provides for common action of defence against countries giving bounties, Her Majesty's Government should, on the renewal of those treaties, and also in the

negociation of new ones, take into consideration the propriety of stipulating for such liberty of action as will enable them in the last resort to impose a countervailing duty."

I have, &c.,

(Signed) N. LUBBOCK,

Deputy Chairman.

West India Committee,

19th October, 1880.

THE RIGHT HON. JOSEPH CHAMBERLAIN, M.P., &c.,

President of the Board of Trade.

Sir,

I have the honour to call your attention to the question of the operation of the new law on sugar duties in Holland. The evidence laid before the Select Committee on Sugar Industries showed that under the law which has been in existence for some years past a considerable bounty arose, and the Committee report that in the new law which has recently passed the Dutch Chambers the objectionable classification by colour is still retained. Under this system of classification by colour a large excess yield, which escapes duty, has always been obtained. The Dutch Government appear to have arrived at this knowledge by a process of analysis, but instead of fixing the yield of the sugars, classed according to the colour standards in accordance with the results of this analysis, the old conventional yields appear to be retained. Thus, for instance, while the 2nd class of sugar, Nos. 10 to 14, Dutch Colour Standards, is legally estimated to yield only 88 per cent. of refined sugar, the Government appear, by their experiments, to contemplate an actual yield of 97 per cent., leaving an excess yield, on which no duty can be charged, of 9 per cent. In the case of the 3rd and 4th classes, the excess yield is much larger, being 14 to 20 per cent. respectively. You will therefore, Sir, perceive that the new Legislation in Holland is calculated to maintain and confirm the bounty system; and this fact, in view of the action taken by Her Majesty's Government in submitting the question to a Parliamentary inquiry, is deserving, we humbly submit, of the consideration of the Board of Trade, with whom the question at present rests. The Select Committee came to the conclusion that so long as drawbacks

were allowed on the export of sugar, bounties to a more or less extent would inevitably arise. The Committee therefore recommend, in their report, that an International Conference should be called to agree upon a system of refining in bond, which would obviate all drawbacks and all bounties arising therefrom. In the letter which the West India Committee had the honour of addressing to the Earl Granville on the 30th September last, which has been referred to the Board of Trade, the opinion of the German Sugar Industry was made the ground of a request that Her Majesty's Government would consent to take steps to secure a Conference. The present state of affairs in Holland induces the West India Committee to repeat, most earnestly, the suggestion of a Conference to be held as soon as possible. And as Holland has taken part in previous Conferences, and more than once urged refining in bond, (and provisionally agreed to it) as the basis of a Convention, it might be expected that no obstacle to the meeting of such a Conference would be raised by the Government of that country.

I have, &c.,
(Signed) THOS. DANIEL HILL,
Chairman.

West India Committee,
22nd October, 1880.

To THE RIGHT HON. JOSEPH CHAMBERLAIN, M.P., &c.,
President of the Board of Trade.
Sir,

I have the honour to draw your attention to the conclusions of the Select Committee on Sugar Industries bearing upon the bounties arising in Austria-Hungary, at page xi. of the Blue Book, No. 332, Session 2, 1880. The fiscal arrangements enable the manufacturer to produce twice as much sugar as the estimated yield on which he pays duty, under the system of drawbacks on export; therefore a very large bounty is given, the drawbacks at one time absorbing the whole of the revenue derived from the sugar duties. For 1879-80, the legal yield for duty purposes was nearly doubled, and a minimum revenue from duty was settled at six million florins.

The Select Committee then refer to a further law raising the minimum of revenue from 6 millions to 10 millions of florins. The

anticipation expressed by the Committee that new laws would result in fresh expedients, and no reduction of the bounty would be effected, is confirmed by the following extract (translated) from the *Neue Freie Presse* of Vienna, dated 22nd September, 1880:—

"If we take the inhabitants of Austria-Hungary, including Bosnia and Herzegovina, to number 38 millions, and the consumption per head to be 5·55 kilos., we get a total consumption of 2,109,000 metre centners, which, with a duty of 11·55 fl., according to the Restitution Tariff, should bring in to the Treasury 24,358,950 fl. Instead of this the duty for the next year amounts to 10,000,000 fl., and there remains, therefore, for the whole industry a profit on the duty of 14,358,950 fl., which amount, divided among the 226 factories of Austria-Hungary, gives to each, in round numbers, about 64,000 fl."

The Select Committee, in their report, then refer to a debate in the Austrian Reichsrath, on the 13th May, 1880, which resulted in the passing of resolutions contemplating a further and more stringent law in 1881, to prevent bounties, and condemning them as "heavy frauds upon the revenue," calling for the serious consideration of the Government.

The Austrian Chamber of Deputies, therefore, in the opinion of the Select Committee, would desire to bring about an international agreement for the removal of bounties. Another argument is thus afforded for the proposal that Her Majesty's Government should take the initiative in securing a Conference as soon as possible, to which the Austrian Government would be a party. The exchange of information, and the other advantages arising from such a Conference, might be expected to materially assist the Government of Austria-Hungary in proposing legislation to the Chambers, and in protecting the revenue from the serious losses to which it is now, and has been for some years past, subject.

I have, therefore, humbly to repeat the suggestion, expressed in former communications, of an International Conference on the basis of the Select Committee's report.

I have, &c.,

(Signed) N. LUBBOCK,
Deputy Chairman.

West India Committee,

9, Billiter Square, E.C.,

18th November, 1880.

THE RIGHT HON. W. E. GLADSTONE, M.P., &c., &c.,
First Lord of the Treasury.

Sir,

In the *Times* of October 27th extended reference is made, in a letter from Vienna, to negotiations between Austria and Servia, in which the question of the most favoured nation treatment arose. The information contained in the *Times* is extracted from official documents published in the Austrian Red Book. It is observed that Austria demanded from Servia the most favoured nation treatment which, in the view of the Austrian Government, meant "equal treatment" as a general principle, the breach of which, in the view of the Austrian Government, would justify countervailing duties.

It must be obvious to the Austrian Government that when sugar is imported from Austria into the United Kingdom under a bounty, it has an advantage over other sugar which may come from States entitled to the most favoured nation terms. Therefore, according to the doctrine laid down by the Austrian Government, the continuance, by Great Britain, to allow sugar to be imported from certain foreign countries under bounty is a breach of the favoured nation clause and a denial of "equal treatment."

The above point would be of undoubted importance in any negotiations that may be entered upon in reference to the sugar question. The West India Committee admit that, in the recently passed and existing law respecting the sugar duties, the Austrian Government have shown their desire to abolish bounties, and I am to pray that Her Majesty's Government would now take such a course as would facilitate the desired result. With this view I am most earnestly to repeat the suggestion that negotiations for a Conference, as recommended by the Select Committee, should be opened, and the West India Committee hope to hear from you, Sir, that such Conference will shortly meet.

I have, &c.,

(Signed)

THOS. DANIEL HILL,

Chairman.

West India Committee,

9, Billiter Square, E.C.,

19th November, 1880.

THE RIGHT HON. THE EARL GRANVILLE, K.G., &c., &c.,
Secretary of State for Foreign Affairs.

My Lord,

We have observed from the telegraphic information from Pesth, in the *Times* of the 15th November, that the Hungarian Minister of Finance had laid before the Lower House of the Diet a series of Bills, one of them providing for the alteration of the taxes on sugar.

I have humbly to request that your Lordship would be pleased to obtain from Her Majesty's Ambassador in Vienna some information respecting this proposed alteration in the Hungarian sugar duties.

I have, &c.,
(Signed,) THOS. DANIEL HILL,

Chairman.

THE EFFECT OF COUNTERVAILING A BOUNTY.

Out of the many recent letters in the daily papers we reproduce the following, as being a remarkably clear reply to the Editorial political economy of the sugar question :—

To THE EDITOR OF THE "LIVERPOOL DAILY POST."

SIR,—I hope you will allow me to controvert the reasoning of the article on the sugar question which appeared in your paper last week, and to dispute the accuracy of its conclusions. You say, in answer to the question, "In what way such a method of abolishing a bounty (*i.e.*, by a countervailing duty) would differ in its effect from the process of obtaining its abolition by treaty," that "this latter result would be an unmixed good," leaving everything to free trade and skilled rivalry, but "the operation of a countervailing duty would be trebly objectionable."

"First,—It would give a premium to the lazy and unenterprising conduct of sugar refining in this country."

The answer to this is, that, as the operation of a countervailing duty would not prevent the importation of a single ton of sugar, raw or refined, that would come to this country if there were neither duties, drawbacks, nor bounties on sugar in Europe, we should be in exactly the same position as regards free trade and skilled rivalry as cotton spinners or any other free manufacturing industry, and if there were lazy and unenterprising sugar refiners, free competition would crush them out by the operation of the inexorable law of the survival of the fittest.

"Secondly,—It would lead to the foreign bounties being increased, and commence, on the falsest economical principle, a miserable competition in pampered manufacture."—Answer. The mistaken object of foreign Governments in giving bounties is to encourage their own manufacturers at the expense of their general taxpayers, but it is impossible to imagine a foreign Government so stupid as to increase bounties (which would immediately be met by an equivalent increase of duty here) when the only result would be not to stimulate its own industry, but to swell the exchequer and relieve the taxpayers of another nation, bearing in mind that all the while this country would be getting supplied with yearly increasing quantities of sugar, the result of free competition in sugar growing, no longer handicapped as at present. N.B.—In the seven years ending 1878, the production of beet sugar increased 548,000 tons, or 63 per cent., and cane sugar increased only 99,000 tons, or 6 per cent.

"Thirdly,—A countervailing duty would give a protective price to a valuable article of consumption, &c."

This is exactly what it would not do. Nor is a countervailing duty a protective duty by any correct definition of the words. A protective duty is put on to raise the price of the protected commodity above the natural free trade level, and it has this effect so long as the protective duty lasts. A countervailing duty merely prevents prices falling below the natural free trade level,

and restores full and free competition, which cannot and does not exist in the presence of bounties.

Allow me to point out that the fallacy which seems to be ever present in the minds of those whose opinions coincide with the article in question is this—They think that the public is in the present enjoyment of all the benefits of what they erroneously believe to be unrestricted free trade, plus the bonus of which the economical folly of foreign Governments makes us a present. Now this is impossible, and this the proof: Suppose that 200,000 tons of sugar per annum is imported with a bounty of £2 per ton—£400,000 which is paid by foreign Governments; this lowers the price of the remaining sugar, say about 700,000 tons, imported without a bounty, also £2 per ton below the natural level of competitive free trade prices, and thus inflicts a fine on sugar growers all over the world of about a million and a half sterling per annum. Whatever this amount may be, it acts in exact proportion to the amount as a deterrent to the increased supply of sugar, and ultimately prevents the consumer reaping the benefit of that law of political economy which in the long run keeps down profits in every free industry to the same level as every other outlet of capital and skill.

But you may say, “I don’t care for the long run. It is nothing to me that cane sugar growers will in time cease to send us sugar at or below prime cost. At present I am paying less than the natural price for sugar, and the future may take care of itself.”

But even this position is not sound, for, owing to the artificial stimulus to beet, and consequent stoppage of the natural increase of cane sugar, as evidenced by the figures above, we are putting too many saccharine eggs into one basket. The result was that in 1876, and again in 1879, a short crop of beet and an anticipated deficiency in the sugar supply, which was only partially realized, caused prices of sugar all over the world to rise £8 to £10 per ton, and the consumers in the United Kingdom actually paid about six millions sterling for their sugar more than they would have done had the area of supply been greater. This amounts to as much as a 4d. income tax, and was borne without a murmur by

the British public, who, no doubt, considered it a law of nature, and not the result of a vicious system, upheld by those who decline to discuss, without prejudice, the only practical remedy—who think that they are the sole depositaries of economic truth, and that wisdom will die with them.—Yours, &c.,

JAMES BARROW.

323, Vauxhall Road, Liverpool, Nov. 2nd, 1880.

THE BOARD OF TRADE ON COUNTERVAILING DUTIES.

A leading Scotch Liberal paper, the *North British Daily Mail*, again speaks out honestly. We give the following important extract:—

Mr. J. H. Farrer's letter to the Workmen's National Executive Committee for the Abolition of Foreign Sugar Bounties is most discouraging to the prospect of having this evil corrected by the imposition of countervailing duties. The Board of Trade instructs Mr. Farrer to say that the whole subject of the sugar bounties, together with the report of the Select Committee of the House of Commons upon them, is receiving the careful consideration of Her Majesty's Government, and a communication will be made to those interested so soon as a decision has been arrived at. But the Board of Trade, through Mr. Farrer, volunteers this further statement, that "the objections to countervailing duties are so great that the Government are not prepared to entertain their consideration." This statement we think is more frank than satisfactory. Her Majesty's Government may very laudably desire to check in the bud any rising hope that the recommendation of the Select Committee is likely to be acted upon, but we confess it does appear to us that there is an inconsistency between the admission that "the whole subject with the report of the Committee" is receiving the attention of the Government and the subsequent statement that the Government has determined not even to entertain the proposal to levy countervailing duties. This proposal is a part of "the whole subject" and of the report of the Committee, and a very important part. Indeed, if it be excised from the report of the Select

Committee we do not very well see what there is in it left for her Majesty's Government to consider. It is practically the sum and substance of the report, and in our opinion it would have been more respectful to the Committee and more satisfactory to those interested in this question if the Board of Trade had deferred thus expressing the determination of the Government until that "careful consideration" which it speaks of had been given to the whole subject, and until it was prepared to state more fully the nature of the objections which, in the opinion of the Government, are so great as to constrain them not even to entertain the consideration of what is really the most essential portion of the question. Whoever inspired Mr. Farrer thus to speak in the name of Her Majesty's Government may be commended for his candour, but certainly not for his wisdom. It is on the face of it absurd to say that a full consideration will be given to a question, when on the very threshold of such a consideration we are told that one of the most important elements will be absolutely excluded from it. We know that there are many grave objections which can be urged against the proposal to levy a countervailing duty, and it is possible that Her Majesty's Government are aware of others which, in their opinion, would render the scheme impracticable. But the enunciation of such an absolute opinion against the proposal should have followed and not preceded a statement of these objections. We are open to conviction on the question, but a mere dogmatic assertion either of the opinion of the Board of Trade or of Her Majesty's Government will neither satisfy us nor the section of the public interested in the settlement of the question. We entertain a strong opinion that the European Governments which grant these bounties on the export of refined sugar have not been pressed to the extent they might have been in respect to their impolicy and their injustice. Our diplomats waste acres of paper discussing the affairs of nations and of peoples in whom we have no real concern, and we cannot but think that if even a portion of the energy thus wasted was devoted to the subject of the sugar bounties we would have had them abolished years ago.

FRYER'S DESTRUCTOR.

In our June issue, 1877, we published a paper by Mr. Alfred Fryer, on his system for the disposal and treatment of town refuse, which had been adopted with success by the Corporation of Manchester. Several other towns have since availed themselves of its advantages, which are the conversion of street sweepings and accumulations of every sort, hard or soft, to profitable uses. From these offensive materials an inoffensive dry manure is produced, and mortar of superior quality; and for both there is a brisk demand at high prices. These undoubted benefits, from its application in temperate climates, can hardly fail to be of enhanced value in populous intertropical centres, which has induced us to recall the attention of our friends, in those seething regions, to the paper we have referred to, and present them with the following account of what Mr. Fryer calls his "Destructor," written by a Special Commissioner of the *Leeds Express*, and recently published in that journal :—

Wayfarers on Armley Road may have noticed on their right as they turn from Wellington Road a huge square brick chimney stack and a large shed of corrugated iron perched up above the level of the ground. This is the Corporation furnace where ashes and other useless refuse are burnt out of the way. Some years ago Mr. Fryer, of Nottingham, patented an invention which should relieve corporations of large towns from the unpleasant dilemmas they were sometimes in as to the disposal of the emptyings of the ash pits, &c. The first in Leeds was erected nearly three years ago at Burmantofts. The second was built last year at Armley Road, and put into operation in October. The success of Fryer's Patent Destructors has been unequivocal, and deputations from many important towns have visited the Armley Road Destructor, to obtain some idea of its working. The latest visit was on Tuesday, when the Mayor of Salford and some members of the Sanitary Committee were shown over the works by Dr. Goldie. There are two entrances from Armley Road, one passing the office of the foreman, down to the fiery cells and the mortar pans, and

the other leading up an inclined road into the large iron shed, where all the refuse is deposited previous to its being shot into the furnace beneath. Entering by the first gate, we find ourselves in the little office of the foreman, which is as clean and spotless as the kitchen of a Dutch *rouw*. Everything is polished up, even the arm of the weighing machine, which shines bright as silver, entirely in harmony with a cleanliness which would hardly be expected from a place devoted to refuse of every description.

The foreman, Mr. Herbert Uttley, who is as civil and obliging a guide as can be desired, pointed out to us a road running along the right hand wall of the yard, which is being newly risen to allow carts with the more valuable portions of the night-soil to pass along and discharge their burden into barges in the canal at the bottom of the yard. To our left is the huge chimney stack, towering 146ft. into the air, and standing on a square base of 14ft. on each side. Its ornamental top is of cast iron, bolted together in four parts. Underneath the shed of corrugated iron the first door opens into the engine house. Here again we have a specimen of cleanliness and extreme neatness. The walls are as white as whitewash can make them, whilst the floor would shame many a kitchen for cleanliness. The engine is horizontal, and of 16-horse power, built specially by Manlove, Alliott, and Fryer, of Nottingham and Rouen—the latter gentleman being the inventor of the Destructor. The engine is on the automatic principle, regulating for itself the quantity of steam required. When once started at a given quantity of steam, it will regulate itself at 40lbs. or 50lbs. pressure, and never require attention, except for cleaning and oiling. Every part about it, save those which are painted, is bright and burnished, and the contrast of the bright golden hue of the brasswork and the bright silvery glitter of the iron, with the two shades of marone with which the other portion of the engine is painted, is most effective. The foundation of the engine is on one bed, dispensing entirely with pillars and slide bars which are fixed with bolts and keys. The crank is circular and solid, with a diameter of about 2ft. 9in., which is held to be superior to the old straight arm crank, and able to balance the engine much better.

The fly-wheel, of cast iron, is 10ft. in diameter, with a 12in. rim, turned up true, and keyed on an 8in. iron shaft. The boss of the fly-wheel is hooped with two 1 $\frac{3}{4}$ -inch square hoops, turned up and polished. At present, and for some time back, the engine has run night and day, in consequence of the great demand for mortar. Leaving the engine-room, close by are two mortar pans, with the stones revolving in them after the fashion of those so familiar in builders' yards. These pans are also part of Mr. Fryer's system. The rollers are 4ft. 2in. in diameter and 16 inches thick. The advantage is that the pans empty themselves as soon as the stuff is made to a paste, without the intervention of a labourer. Here our attention was drawn to three great furnaces close by, from which a workman was pulling huge masses of red-hot clinkers into an iron barrow. These furnaces, technically called "cells," are roaring with a fierce draught, which, obtained from the huge chimney, is sufficient to reduce to dust and clinkers anything, of whatever nature, thrown into the fire. The mouths of the cells resemble the fire-doors underneath an ordinary boiler, and have nothing singular about them. There are six cells—three on each side—underneath the upper shed. The boiler is multitubular, and is 9ft. 2in. long and 8ft. in diameter, with 132 tubes running through it. The enormous heat from the destructors passes through these tubes and heats the water. From the starting of the engine up to the present, the 16-horse power engine has been run without the use of a single ton of coals. The heat from the burning mass of rubbish is sufficient to create more steam than is needed for even this powerful engine. Thus, the mortar is made with little cost save that of material and the inevitable wear and tear.

The cells are cleaned out of the hard clinkers, &c., every two hours, and the latter are slacked cold as soon as drawn, and then put into the mortar pans, which are close by, in the proportion of three parts of clinker to one of best Micklefield lime, which, with the requisite amount of water, makes mortar which is considered equal to the best Portland cement. When spread on a wall or other surface, and thoroughly dry, it is impossible to drive an ordinary nail through it. There is such a great demand for this

mortar, which is sold at 5s. per ton, not only to the Corporation departments, but extensively to builders, that the engine and pans have been running night and day, with the only intermission of Sundays, for some time. There is every appliance kept here for the use and comfort of the men. After each drawing the spaces round the mouths of the cells are swept clean, and there is an air of neatness and regularity and order about the entire place which can only be the result of watchful though kindly supervision, and of willing and cheerful attention on the part of the men. Upstairs, in the large shed, we see a few heaps of refuse which have come in to be destroyed, but the great bulk comes in at nights, between certain specified hours. But here, where loathsome refuse is brought day by day, there is no smell, nor no little heaps of dirt festering in corners to pollute the air, everything being as neat as downstairs. Lifting up an iron lid, we peer down into the cells beneath, filled with incandescent material, but no heat or smoke offend us, for that is drawn up by the enormous draught into the chimney.

Down these feed-holes many curious things are put to be burnt. Old iron and tin are common enough, but these, if possible, are saved, and put on a heap in the yard, and sold at a small price per ton for old metal. But if these were allowed to stop long enough in the cells they would be burnt away, as the heat is sufficient to burn a piece of iron $1\frac{1}{2}$ inch square to nothing in half-an-hour. Horses, cows, pigs, and even donkeys are brought here to consume. The old adage has it that "experience teaches," and experience has taught the manager here some curious facts concerning the cremation of animals. From long observation he affirms that whilst a pig, from its fatness, consumes the swiftest of any of the animal tribe, and a horse or a cow can be burnt up in an hour, a donkey takes from four to five hours to be effectually cremated; its native obstinacy thus showing strong even in its last hours. The most curious things are brought here to be burned, such as old beds, old utensils, boots, broken-down furniture, dogs, cats, domestic pets, cages, and a numerous assortment of articles which the owners find a difficulty in getting rid of. During the past six months the number of loads of rubbish destroyed has been:—April,

778; May, 725; June, 824; July, 715; August, 715; September, 865, or a total of 4,622 loads, or 5,546 tons. The great merit of Mr. Fryer's system is that there is some return for the large outlay incurred. The Armley Road Works cost between £4,000 and £5,000. In consideration of the great benefit arising from the solution of the long vexed ash-pit question, this outlay, reckoning as an offset the income arising from the sale of mortar, old iron, &c., cannot be considered an extravagant or unnecessary one. The works are a credit to the Corporation from the admirably clean and orderly manner in which they are kept by those in charge.

MESSRS. J. B. LAWES AND J. H. GILBERT ON THE
RESULTS OF EXPERIMENTS ON THE MIXED
HERBAGE OF PERMANENT MEADOW.

By NEVILLE LUBBOCK.

Professor Tyndall, in one of his lectures, has described a scientific experiment as a question addressed to nature; such questions has Mr. J. B. Lawes been putting to nature at Rothamsted during the last 36 years; and some of the answers he has received have been the subject of a paper, which Messrs. Lawes and Gilbert have recently written, and which have been published in the Transactions of the Royal Society.

The paper in question only so far deals with the experiments on the mixed herbage of permanent meadows; but we think these results cannot fail to be of considerable interest to sugar cane growers, as it would seem not improbable that a mode of treatment which encourages the growth of gramineous crops, in this country, would show good results if applied to the sugar cane.

The first point we will call attention to, is the comparative effect on grass of equal quantities of nitrogen, administered in the form of sulphate of ammonia and nitrate of soda; and its effect, in both forms, as compared with crops grown on unmanured land.

The following are the average crops produced over a period of eighteen years:—

	Per Acre.
1. On unmanured land	2350 lbs. of hay.
2. With 400 lbs. Sulphate of Ammonia per acre	2839 ,,
3. With 550 lbs. Nitrate of Soda per acre....	3968 ,,

Comparing now the average crops of the second period of ten years with those of the first period of eight years, the diminution of crops has been for the second period—

1. On unmanured land.....	10·4 per cent.
2. With Sulphate of Ammonia	25·1 ,,
3. With Nitrate of Soda	3·1 ,,

Thus the crops, treated with Sulphate of Ammonia and Nitrate of Soda, show a large excess over those obtained from the unmanured land; but it is interesting and instructive to note, not only how much larger have been the crops grown with the Nitrate of Soda, over those grown with the Sulphate of Ammonia, but also that Nitrate of Soda does not seem to diminish the productiveness of the land so soon as Sulphate of Ammonia; a result which Messrs. Lawes and Gilbert attribute, mainly, to the well-known fact that the nitrogen of Nitrate of Soda distributes much more rapidly, not only in the upper but also in the lower layers of the soil, than does that of the Ammonia salts; hence a greater development of some of the deeper rooting herbage, and a greater distribution of roots in the lower layers.

Let us now compare the quality of the crops in question. The following table gives the average quantity of nitrogen produced by each of the three crops; the percentage of the nitrogen to the crop; also the quantity of mineral matter or ash; and the percentage of this to the crop.

	Nitrogen.	Per Cent.	Ash.	Per Cent.
		lbs.		lbs.
1. Unmanured Land ..	32·2 ..	1·37 ..	134·9 ..	5·74
2. Sulphate of Ammonia	51·7 ..	1·82 ..	135·3 ..	4·77
3. Nitrate of Soda ..	62·2 ..	1·57 ..	214·5 ..	5·40

Thus, not only was the quantity of produce raised on the land treated with nitrogen, in the form of nitrate of soda, considerably

in excess of that raised from land treated with sulphate of ammonia, containing an equal quantity of nitrogen; but, if we may take the quantity of mineral matter in the crop as a test of quality, the quality of the produce was also superior to that grown with the ammonia salt.

We will now compare the crop obtained with 550lbs. nitrate of soda with that obtained with 275lbs. only or one half.

With 550lbs. nitrate, average of 18 years 3968lbs. Hay.

 ,, 275lbs. ,, ,, ,, ,, 3792lbs. ,,

It will be remarked, how slight is the excess of crop obtained by doubling the quantity of nitrate of soda; and also that, whereas the application of 275 lbs. of nitrate of soda increased the average crop over that of the unmanured land by 1442 lbs.; increasing the quantity to 550 lbs., only further increased the crop by 176 lbs.

We have already noticed, that when sulphate of ammonia is used alone, to the extent of 400 lbs. per acre, the crops rapidly diminish in quantity; for instance, the crops grown with this for 18 years in succession, were, on the average 25 per cent. less, during the last 10 years, than during the previous eight years. If however, we compare the average crops obtained during the last seven years, as compared with the previous period of thirteen years, we find, by a table given by Messrs. Lawes and Gilbert, that the average crop, during the first thirteen years, was 3317 lbs. of hay, against 2257 lbs. for the subsequent seven years, or a diminution of 32 per cent. The crop, in fact, for the last seven years, having been actually less than for the average of twenty years on unmanured land.

The following table shows the effect of mixed mineral manure alone, as compared with unmanured land. The mixed mineral manure used was as follows:—

300 lbs. Sulphate of Potass.

100 lbs. ,, Soda (200 lbs. the first eight years.)

100 lbs. ,, Magnesia.

150 lbs. Sulphuric Acid }
200 lbs. Bone Ash } Superphosphate of Lime.

The following are the average crops of hay :—

	Without Manure. No. 1.	Mixed Mineral Manure. No. 2.	No. 2 + or — No. 1.
First period, 10 years ..	2531 lbs. ..	3797 lbs. ..	+ 1266
Second „ 10 „ ..	2236 „ ..	4118 „ ..	+ 1882
Total „ 20 „ ..	2383 „ ..	3958 „ ..	+ 1575
Second period, per cent. } + or — first period ..	— 11·7	+ 8·5.	

Messrs. Lawes and Gilbert remark, as regards these results :— “Here then, with a *mixed mineral manure alone*, we have considerably higher amounts of produce than with nitrogenous manure alone, applied as ammonia salts, and, taking the whole period, nearly as much as when applied as nitrate of soda. Not only so, instead of a reduction in hay, in nitrogen, and in mineral matter, removed over the second, compared with the first ten years, there is an increase of all three over the second period.

“It is, nevertheless, sufficiently established that nitrogenous manures are specially effective in increasing the growth of gramineous crops grown separately on arable land, such as wheat, barley, or oats, all of which contain a comparatively small percentage of nitrogen, and assimilate a comparatively small amount of it over a given area where none is supplied in manure. The highly nitrogenous leguminous crops, on the other hand, such as beans, peas, clover, &c., are not characteristically benefited by the use of direct nitrogenous manures, though nitrates do act more favourably on them than ammonic-salts. Again, whilst, under equal conditions of soil and seasons, mineral manures alone increase comparatively little the gramineous crops grown separately, such manures, and especially potass manures, do in a striking degree increase the amount of nitrogen they assimilate over a given area.”

“Consistently with this, as will be fully illustrated in the proper place, the application to the mixed herbage of the mineral manure, containing potass, as above described, did very considerably increase the growth of leguminous species. But, more or less from the beginning, and especially in the later seasons, it increased that of some gramineous species very much also—indeed, much more

than our experience in the growth of gramineous crops by mineral manures on arable land lead us to anticipate."

We will now compare the crops raised by nitrate of soda alone with those raised by nitrate of soda in conjunction with mixed mineral manures. The quantity of nitrate of soda being in each case 550lbs., and the mixed mineral manure the same as that previously given. The following are the average crops of hay:—

	Nitrate Soda alone. No. 1.	Nitrate Soda with mixed mineral manure. No. 2. No. 1.	Nitrate Soda + or — No. 2. No. 1.
First period, 8 years ..	4038 lbs. ..	5944 lbs. +	1906
Second , , 10 , , ..	3913 , , ..	6777 , , +	2864
Total , , 18 , , ..	3968 , , ..	6407 , , +	2439
Second period, per cent. + or — first period ..	— 3·1	+ 14·0	

There is thus a very marked increase of crop, consequent on the use of the mineral manure in addition to the nitrate; and it must also be remarked that where the mineral manure has been used the crops during the second period showed an increase of 14 per cent. over those of the first period as compared with a diminution of 3·1 per cent., when the nitrogenous manure alone was applied.

Comparing once more the results from an application of 275 lbs. of nitrate of soda with those from 550 lbs. of nitrate or similar quantity of mixed mineral manure, as above detailed, being used in both cases we find:—

	550lbs. Nitrate with Mixed Mineral Manure. No. 1	275lbs. Nitrate with Mixed Mineral Manure. No. 2. No. 1.
First period, 8 years ..	5944lbs. Hay ..	5058lbs. Hay — 886lbs.
Second , , 10 , , ..	6777 , , ..	5332 , , — 1445lbs.
Total , , 18 , , ..	6407 , , ..	5210 , , — 1197lbs.
Second period, per cent. + or — first period ..	+ 14·0	+ 5·4

It thus appears that when applied with the mineral manure the

excess of nitrate of soda beyond 275 lbs. has produced far more effect than when applied alone.

In connection with the results obtained from a mixture of nitrogenous and mineral manure, Messrs. Lawes and Gilbert remark, "It is obvious that it was of potass chiefly, of phosphoric acid also notably, but of most of the mineral constituents more or less, that the available supply had become so deficient under the continuous applications of the ammoniac salts. It has already been illustrated how ineffective was a supply of phosphoric acid (super phosphate) when used alone, and how comparatively little was its effect when used in conjunction with ammoniac salts, but without potass; and we have here again strikingly brought out the influence of a liberal available supply of potass within the soil, both upon the quantity and quality of the produce."

There is one other point which is remarkable, viz., the effect of nitrate soda in a year of drought, as compared with sulphate of ammonia. The following table shows the average crops for 20 years with mixed mineral manures and 400 lbs. ammoniac salts, and those with the same mineral manures and 550 lbs. of nitrate of soda; giving also the crops for the years 1869 and 1870, which were respectively the years of the highest and lowest productiveness during the period:—

Average of 20 years.	Mixed mineral manure, & 400 lbs. ammoniac salts. lbs. hay.	Mixed mineral manure, & 500 lbs. nitrate of soda.
1856—1875	5711	6407
1869	7700	8526
1870	3306	6300
+ or — { 1869	+ 1989	+ 2119
average { 1870	— 2405	— 107

The superiority of the nitrate of soda for the year 1870, the year of drought, was it is seen most marked.

In conclusion, we must remind sugar cane planters that the experiments detailed have been made on mixed herbage, and that such herbage is composed, not only of gramineous, but also of leguminous and other species; and Messrs. Lawes and Gilbert

point out in the clearest manner in their paper that when manure is applied to such mixed herbage, a struggle for life is set up between the different species, or we ought, perhaps, more correctly to say, that the struggle for life, which is always going on, has its conditions altered, to the advantage of one or other species, according to the kind of manure applied. In estimating the results of these experiments, and the lessons to be drawn from them, this must be clearly borne in mind, since it is not improbable that, with purely gramineous crops, the results might be to a certain extent, and perhaps appreciably, modified.

No doubt, or at any rate we may well hope, that this paper is only a forerunner of others to follow, dealing with Mr. Lawes' experiments with purely gramineous crops, such as wheat and barley.

FROSTED CANE.

From the "Rural World."

When a frost shall have killed the foliage on cane, the sooner it is cut and protected from the sun's rays, the better. I should not attempt to strip or even top it, but cut and stand it in round shocks and tie the tops about two feet below the seed tufts. In this condition the leaves will shade the stalk, and the seed will fully cure; as soon as you are ready to mill the cane strike off the tufts or haul them with the cane to the mill and cut them off there, and select the best for seed, devoting the balance to stock feed. It will pay to save it. The method suggested by friend Miller, of windrowing, is a quick way; and the Louisiana method, which does very well, except in case of severe storms of rain, when it is liable to get wet, and often under mud and water. Mr. Nason's large crop in Perry county, Ill., was windrowed for the sake of speed, but it gave us much trouble to handle it afterwards; besides, it became very dirty. We milled it, leaves, dirt and all, as well as much of the seed tufts, making a fair syrup, all things considered. The matter of stripping cane is a question that I hope will be settled soon. I have urged different operators to put it to a fair test and report results.

I saw Mr. G. W. Allen, of Westport, Mo., last week, working a No. 5 Victor mill with four horses on a fourteen-foot lever, grinding fresh cut cane with leaves on. I timed his team, and found two and a half revolutions per minute, passing an average of fifty medium canes at a time through the mill, giving, by actual measure, two gallons of juice per minute. This was not up to the capacity of the mill, as the team worked moderately.

I. A. HEDGES.

NOTE ON YELLOW FEVER.

BY DR. T. L. PHIPSON.

This is not the place, nor is it my intention, to write a long medical dissertation, but the few words I have to say on the subject of yellow fever, may perhaps prove useful in many countries where this magazine is read.

The disease in question, also known as *vomito-negro*, hæmogastric pestilence, &c., was first noticed in the West Indies in 1647, where it is as common as *remittent fever* is in India. It is an infectious continued fever characterized by languour, headache, shiverings, rachialgia (pain in the back and loins), eyes moist and suffused, countenance flushed, skin at first red soon gradually acquires a lemon yellow or greenish yellow tint; in bad cases there is more or less delirium; vomiting, first of a clear glairy fluid, then of matters of a dark coffee colour, which sometimes turn green after dejection; and hiccup.

The ordinary allopathic treatment recommended by our best authorities is very unsatisfactory in many respects, and this is the reason why it may be useful to note that considerable success has attended of late years the application of the new dosimetric method of treating acute diseases by Professor Burggraeve, of Ghent University. In Dr. Burggraeve's new method the alkaloids and arseniates are given in small repeated doses until the desired therapeutic effect is obtained. These very powerful medicines can only be administered safely by the dosimetric method, in the form of minute granules (not to be confounded with the homœopathic globule, which is quite another thing). Twelve very remarkable cases were published not long since in Burggraeve's *Répertoire Universel de Thérapeutique Dosimétrique*, by Dr. Da Sylva, of Pernambuco. The treatment was very similar in all of them: first a bottle of purgative *lemonade* (containing *citrate of magnesia*); as soon as it had acted one granule of *aconitine* (about $\frac{1}{10}$ grain) every half-hour (or every quarter of an hour in bad cases) until the heat comes down—which generally occurs in 12 to 36 hours.

If vomiting supervene, *sulphate of strychnine* granules are given (one granule every hour). As soon as the pulse and heat have been brought down, *arseniate of quinine*, one granule every two hours, in place of the aconitine, is given. The treatment lasts from 1 to 8 days. It is simple enough in experienced hands. I have already given some account of it in my *Journal of Medicine* for March last, and intend to return more fully to the subject very shortly, on account of its great importance to our West India colonies. Of the twelve cases published by Da Sylva as illustrative of his treatment by the Burggraeve method, ten were cured and two died.

All diseases of the zymotic type such as yellow fever, small pox, measles, scarlatina, diphtheria, croup, whooping-cough, typhus and typhoid, simple continued fever, quinsey, erysipelas, puerperal fever, carbuncle, influenza, dysentery, diarrhoea, cholera, plague, remittent or relapsing fever, malarial fever and rheumatism, are due to an analogous cause, and are all in great measure preventible by strict attention to sanitary precautions. Modern research has pointed out the nature of the particular *miasma* (or bacterium) which is active in several of them. Each of these diseases has its own special *bacterium* which can only propagate in the blood at a given temperature and in certain special conditions. Hence the great value of cleanliness (so rare in many of the ships which touch at West Indian ports) and the liberal use of antiseptics, among the best of which we may mention *sulphurous acid* (burning sulphur), sulphuretted hydrogen, carbolic acid, and chlorine (chloride of lime), either of which active substances may be used separately for disinfecting, that is, for the destruction of *miasma*. Fire is another great preservative, but less easily applied in a complete manner. The powerful granular medicaments used in the dosimetric method above alluded to, are rapidly diffused through the system, and act also as antiseptics, whilst controlling the fever heat by their influence on the vaso-motor nerves, &c.

London, Nov. 3rd, 1880.

Correspondence.

THE NEW SUGAR MILL AT ALBERTON, QUEENSLAND.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

Your readers have no reason to complain of want of liberality in allowing your columns to be open to descriptions of new apparatus and new processes. Some of these we have watched from their being first launched until they have become assured successes, and have taken their places permanently in the technology of sugar manufacture. Others occasionally appear, and although neither theory nor experience appear to be on their side, their advocates display a pertinacity that in some walks of life would lead to brilliant success.

In your October issue you reproduce an article from *The Queenslander* which states that certain cane-growers, persevering Germans and small capitalists, who have much to lose by failure, have erected a small central factory. These consist of a very small cane mill and an evaporator, which is supposed to be a novelty, and which consists of an apparatus for driving air through heated cane juice.

If the method possessed any theoretical attractions, and seemed calculated to supply some known deficiency, and had been overlooked by the able and scientific planters to be found in the older sugar colonies, we should have thought that the small capitalists referred to would have shown more of their Teutonic prudence and shrewdness if they had adhered to methods already proved to be successful, instead of perilling their enterprise in any "new-fangled" scheme.

Cane juice requires to be subjected to boiling heat to effect clarification, and it has been found that a considerable portion of the subsequent concentration can be effected by direct heat with greater success than in any other manner, *provided the heat is applied for a short time*. When the juice becomes thickened, some device must be adopted to complete the process at a low temperature, if injury to colour and to chemical composition is to be avoided.

The injurious effect of the air upon cane-juice is well known. When juice is in ebullition the steam steadily given off, interposes a layer of vapour, and prevents the contact of the air. All methods of concentration of juice in considerable volume (except when this is done *in vacuo*, as in the double and triple effect) are discarded in modern apparatus.

The "Alberton evaporator" ingeniously adopts both the foregoing evils. First, volumes of air are introduced into the juice, and oxygen is thus brought into intimate contact with everything in the juice that is oxydisable. Second, a mass of liquid is kept together to be heated and dosed with air until the concentration is conducted to the required stage.

If the inventor of the method had been desirous to keep down the temperature by means of the impact of air, he might have found many better devices by perusing any good history of sugar manufacture. And among others an infinitely better method is the discarded one of the now celebrated Sir Henry Bessemer.

The writer of the article pens some nonsense respecting "churning" liquor, as he seems to be ignorant that the evil of churning is confined to bringing air into contact with the juice.

He also condemns the Bour and Wetzell pans, instruments that have rendered good service, and although neither recent nor the most approved types of apparatus, will yield satisfactory results long after the air-injecting method has been forgotten.

Air pumps are used in sugar manufactories in order to remove the air from the solution of sugar under treatment, but the inventor under review inverts the idea and uses them or their equivalents for impacting air upon the juice.

The process will, as compared with others, be slow and costly, and, in addition to its other peculiarities, will take every particle of dust and mechanical impurity from the air, and leave them in the sugar.

The "Alberton evaporator" will, however, concentrate the sugar at a lower temperature than by ebullition in the open air; yet this object, desirable in itself, is purchased at too great a cost, and is more than counterbalanced by the evils before adverted to. Other objections exist, but need not be referred to.

Your readers will thank you for reproducing notices of what are supposed to be new devices, such as recorded in *The Queenslander*, and those interested in sugar may also thank the German planters for their enterprize. If the method be good, we shall obtain the benefit; if not, they alone must bear the loss.

Yours truly,

Porto, November 7th.

AN OLD PLANTER.

FOR INTENDING EMIGRANTS TO DEMERARA.

To THE EDITOR OF "THE SUGAR CANE."

Sir,

I beg to tender you my sincere thanks for inserting those few words on the subject of emigration to Demerara, in your September issue, more especially as I see that the matter has been noticed in London. In his letter of September 16, the London Correspondent of the *Colonist* says that "Mr. Field has "written to the *Sugar Cane* to deny the statement recently "made in that paper as to the alleged disadvantages of an "overseer's life in Demerara." I send you a copy of the Demerara *Argosy*, which contains a long letter from a manager of the name of Field living here, who must have forgotten that the opinion of a Demerara planter on a paragraph published in Manchester on September 1st would hardly be known in London on September 16th. I will now pass on to consider the letter signed "K.," which appears in your October number. In my letter to you I stated what I believe to be facts. "K." calls me a dissatisfied overseer, and after a page and three-quarters filled with several platitudes, tells me to beware of the bottle. Now, I will presume that "K." is a proprietor of property in this colony, and as such would not like to see the present supply of overseers drop off. If such is the case, surely the best way is to let young men know what they may expect here. 1. I stated that Demerara is a most expensive place to live in. I will supplement this by saying that the purchasing power of money is about half of what it is in England. "K." writes, "That Demerara is an expensive place I

"do not for a moment deny, but if so, incomes of all classes are "usually proportionately high, when we compare the various "occupations and remunerations in the colony with the like "elsewhere." Whose incomes are proportionately high when compared with the like elsewhere? Overseers'? No, certainly not, as I will show later on. 2. I stated in my letter, "He is "told at home that he will get board and lodging." Now, I maintain that the promise of board and lodging would leave the intending emigrant to suppose that his room would be furnished. "K." says "£10 to £15 will supply all furniture needed for "reasonable comfort," and that an overseer's room "is in some "cases furnished." Will "K." give the names of estates where the rooms are furnished by the proprietors? 3. As regards board I wrote to you that overseers were called over to the manager's house to be fed at irregular intervals. "K." answers, "If your "correspondent, instead of mooning (sic) over dinner being late," &c., &c. Will "K." remember that an overseer has to arrange his work to suit the manager's meal hours, and that if breakfast is late he loses his rest in the middle of the day; and that if dinner is late he is debarred from going out in the evening. As far as meals are concerned, I look upon a manager as a kind of boarding master. He is paid to board his overseers, which as a rule he does well, but he certainly ought to remember that it is anything but pleasant for an overseer to be obliged to complain. To prove to you that such is the case, I may mention to you that some time ago the overseers on a large estate wrote to the manager complaining about a subject connected with the boarding, and the answer they received was that he was prepared to receive their resignations if they wished it. 3. Many men leave England under the impression that two hundred and fifty a year means £250. "K." will perhaps remember that although dollars and cents are our currency many if not most of the British West India Islands reckon by £. s. d.—4. "K." calls overseeing an apprenticeship, but he also forgets that you remain an apprentice until you become master. You are never an independent journeyman. 5. No matter what agreement is made in England, unless it is ratified here, an

overseer can be discharged under the Master and Servant's Act in fourteen days' notice. 6. If "K." will take the trouble to consult the *British Guiana Directory* he will see that 12 per cent. of the overseers leave the colony every year, never to return. 7. There is not enough between the pay of a man who knows nothing of planting and one who does. An overseer starts with about £50 a year, and I think I am giving a fair average when I state that after he has worked for three years he will get about £70.

Your obedient Servant,

Demerara, 25th October, 1880.

CANJE CREEK.

MONTHLY LIST OF PATENTS.

Communicated by GEORGE DAVIES, C.E., Patent Agent, 4, St. Ann's Square, Manchester.

ENGLISH.

APPLICATIONS.

4334. SAMUEL HENRY JOHNSON, F.C.S., of Stratford, Essex. *Improvements in the production of saccharine substances.*

4385. CHARLES DICKENSON and JAMES WILLIAM ROBSON, of 8 and 9, Hop Exchange, Surrey. *An improved filter-press.*

4514. WILLIAM FREDERICK NAST, of St. Louis, Missouri, U.S.A., now of Paris, France. *Improvements in the manufacture of dextrine, sugar, and the like, from cellulose of ligneous material.* (A communication from A. C. D. Pockez, of St. Amand les Eaux, France.)

4548. DUGALD MACEACHRAN, of Greenock, Renfrewshire, North Britain. *Improvements in separating iron from animal charcoal, sugar, and saccharine liquids, and in the means or apparatus employed therefor.*

ABRIDGMENTS.

1266. CHARLES DENTON ABEL, of 28, Southampton Buildings, Chancery Lane, Middlesex. *Improvements in apparatus for clarifying and drying lump or loaf sugar.* (A communication from abroad by the Machinenbau-Actiengesellschaft, vormals Breitfeld, Danek & Co., of Prague, Austria.) This apparatus consists of a series of pans, all separately connected by pipes; firstly, with a reservoir for cold compressed air; secondly, with a reservoir for heated compressed air; thirdly, with a reservoir for clarifying liquor; and fourthly, with a steam supply. The pans are all made of one size and shape, so that one lid or cover fits each of them in succession, being con-

veyed from one to the other by a convenient travelling arrangement. The sugar moulds being placed in the first pan, this cover closes the same hermetically, and the clarifying liquor is forced into the sugar by opening a valve connecting the liquor reservoir with the cold compressed air reservoir, and another valve communicating from the first reservoir to the pan. The communication with this liquor reservoir being then closed, cold compressed air is admitted, and the contents of the pan are submitted to this pressure for about three hours. At about the end of the first half hour, steam is admitted to heat the contents of the pan to about 55° Fahr., and this heat is maintained for about two hours. The cover is removed at the end of the three hours, and the second pan is filled with sugar moulds to be treated as in the first case. The contents of the first pan are then submitted to the action of hot compressed air, being themselves heated by steam coils in the pan, and by the time the drying process is completed, the other pans will have been subjected to the liquoring process, and the first pan may be emptied and resilled, the process being thus continuous.

1536. JOHN McLAREN, of Leeds, Yorkshire. *Improvements in the manufacture of sugar.* (A communication from Alexander Richard Mackenzie, of Mackay, Queensland, Australia.) This invention relates to the operation upon the syrup in the vacuum pan, and it consists chiefly in the employment of an ejector for producing the required vacuum; and in utilizing the steam from the ejector for heating the coils of the pan.

3228. HENRY HARRIS LAKE, of Southampton Buildings, London. *An improved method of, and apparatus for drying sugar or other material.* (A communication from Edward E. Quimby, of Orange, New Jersey, United States of America.) This apparatus consists of a steam heated table, upon one end of which the sugar is placed. A reciprocating system of spreaders and pushers is so arranged that the sugar is tumbled over and over, and gradually carried along the table, and discharged in the dry state at the further end. The spreaders and pushers are made triangular in section, so that at the forward stroke the flat part of each pusher is presented to the sugar, and pushes it onwards, and the wedge-formed part is pushed against the sugar at the return stroke of the reciprocating motion, and wedges or ploughs it apart, turning it over and over.

BELGIAN.

51682. T. CARON. *A beetroot planter.*
51718. E. ERNST. *Obtaining manure of spent molasses.*
51928. R. BERGREEN. *A process for increasing the yield of beet-juice.*
52101. A. CORR. *An apparatus for the continuous carbonisation of beet-juice.*
52236. E. TANNEREAU. *Using iron salts in making and refining sugar.*

FRENCH.

134886. LICHT. *Preparing sugar-juice for filtering machines.*

GERMAN.

11304. WÖHLER, of Hoyersdorf. *An apparatus for clearing animal charcoal furnaces of sugar works.*

11342. C. PIEPER, of Berlin. *A continuous process for obtaining lime of molasses by using diluted molasses, together with the known addition of caustic or slaked lime.*

11403. K. LEYSER, of Oschersleben. *An automatic apparatus for removing gas or scum from diffusion vessels, filters, &c.*

11543. E. ERNST, of Beesenlaublingen. *Improvements in his method of obtaining manure of spent molasses, dried with kitchen salt, with an addition of charcoal and animal charcoal.*

11779. G. F. FINCKGRAEFFE, of Leipzig. *A nest for centrifugal machines.*

ITALIAN.

50. D. LICHT, of Magdeburg (Prussia.) *Machinery for purifying sugar-juice.*

104. C. GATOY, of Marseilles. *A process and apparatus for manufacturing refined sugar in prismatic lumps.*

Patentees of Inventions connected with the production, manufacture, and refining of sugar will find *The Sugar Cane* the best medium for their advertisements.

The Sugar Cane has a wide circulation among planters in all sugar producing countries, as well as among refiners, merchants, commission agents, and brokers interested in the trade at home and abroad.

SUGAR STATISTICS—GREAT BRITAIN.

To Nov. 13TH, 1880 AND 1879. IN THOUSANDS OF TONS, TO
THE NEAREST THOUSAND.

	STOCKS. 1880.	1879.	IMPORTS. 1880.	1879.	DELIVERIES. 1880.	1879.
London	66 ..	66	268 ..	286	276 ..	265
Liverpool ..	33 ..	36	194 ..	229	208 ..	217
Bristol	2 ..	3	47 ..	50	47 ..	49
Clyde	30 ..	37	210 ..	230	212 ..	225
Total ..	131	142	719	795	743	756
Decrease..	11		Decrease..	76	Decrease..	13

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